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No. 8

SCOPE OF COMMERCE DEPARTMENT

It will Deal with the Greatest Interests of the World—Our Internal Commerce Amounts to Twenty Millions of Dollars Annually—A Nation of Wonderful Growth.

The new department of commerce, so long talked of and now a reality, will have much to do with the shipping interests of the country, as it takes over from the treasury department the lighthouse establishment, the bureau of navigation, the steamboat inspection service and other bureaus, and will exercise jurisdiction also over the shipping commissioners, the coast and geodetic survey and similar branches of the government closely related to the operation of vessels. Of course the bureau of corporations, through which the enforcement of certain regulations regarding the so-called trusts is looked for, will be a very important feature of the new department. The scope of the new law as to corporations and a summary of the bureaus included in the new department will be found later on in this article.

Only two additions to the cabinet have been created by congress in over a century, and the qualifications of Mr. Geo. B. Cortelyou, the president's secretary, who is to be at the head of the new department, are therefore a matter of considerable interest. To those who have not had the pleasure of meeting Mr. Cortelyou this appointment may occasion some surprise, for he has no political backing whatever and his party beliefs are, if anything, democratic; to those who have met him, however, the appointment is no surprise whatever. He is really one of the most remarkable men in public life and it has been repeatedly stated that he is the most competent man in the country for the office of president of the United States. Association with Mr. Cortelyou for a little while would demonstrate the eminent justice of this statement. He has a positive genius for meeting men and for the dispatch of business. He is apparently never in a hurry and yet he transacts business with the utmost rapidity. In the course of a week's work he represents the president a thousand times and does it better than the president himself could do it. Cortelyou is always well groomed and his poise is always perfect, cool, self possessed and invariably courteous. He possesses the happy faculty of dismissing a man in a moment and yet giving him the impression of a well-rounded interview. He has lifted a position, originally that of a clerkship, into an executive office. He knows how to be swift without hurrying and how to be dignified without being pompous. He entered the service of the federal government as shorthand writer in the office of the fourth-assistant postmaster-general. In 1895 President Cleveland wanted another shorthand writer at the white house, and upon Postmaster General Bissell's description that Cortelyou was as quick as lightning and as methodical as a machine, Mr. Cleveland sent for him. He has been in the white house ever since, President McKinley making him assistant secretary and later secretary and President Roosevelt retaining him in that position. During the last two years of McKinley's tenure of office Cortelyou practically handled the entire correspondence, met all the diplomats on behalf of the president and kept the vast machinery of state in motion. This left the president practically free to deal with questions of policy and legislation. Mr. Cortelyou is now forty years old.

The new department will consist of the bureau of corporations, the bureau of labor, the lighthouse board, the lighthouse establishment, the steamboat inspection service, the bureau of navigation, the bureau of standards, the coast and geodetic survey, the commissioner-general of immigration, the commissioners of immigration, the bureau of immigration and the immigration service at large, the bureau of statistics of the treasury department, the shipping commissioners, the bureau of foreign commerce, the census bureau, and the fish commission.

In this list it will be noted that the bureau of corporations is new. With it comes upon the statute books, in the shape of what is known as the Nelson amendment, the principle that the federal government shall exercise constitutional powers to control and restrain combinations in trade that are to the prejudice of public policy and individual rights. The law declares that it shall be the province and duty of the new department through its bureau of corporations "to foster, promote and develop the foreign and domestic commerce, the mining, manufacturing, shipping and fishery industries, the labor interests, the transportation facilities and the insurance business of the United States." Its head is to be a commissioner of corporations with a salary of $5,000 per annum. This commissioner is to have power to make "diligent investigation into the organization, conduct and management of the business of any corporation, joint stock company, or corporate combination engaged in commerce among the several states, and with foreign nations, excepting common carriers subject to the interstate commerce act, and to gather such information and data as will enable the president of the United States to make recommendations to congress for the regulation of such commerce and to report such data to the president from time to time as he shall require, and the information so obtained, and as much thereof as the president may direct, shall be made public."

In order to accomplish this "the commissioner shall have and exercise the same power and authority in respect to corporations, joint stock companies and combinations subject to the provisions of the law as is conferred on the interstate commerce commission in respect to common carriers, so far as applicable, including the right to subpeona and compel the attendance and testimony of witnesses." All requirements, obligations, liabilities and immunities imposed or conferred by the interstate commerce act also apply to all persons who may be subpoenaed to testify as witnesses or to produce documentary evidence before the commissioner of corporations.

President Roosevelt has selected Mr. James R. Garfield of Cleveland, the second son of the late President Garfield, as commissioner of the bureau of corporations and has already sent his name to the Senate. Mr. Garfield was appointed a year ago by President Roosevelt as civil service commissioner. He possesses extraordinary physical and mental power and is well endowed to perform the arduous labors of this office. He has had a long experience in public life for his years which, while not of a character to bring him into national notice has, nevertheless, given him a large knowledge of affairs. He has several times been a member of the Ohio state senate and was, at one time, its president. But what qualifies him most for this office is a temperate and judicial mind reinforced by abundant courage, abilities of the highest order and unimpeachable honesty.

The new department of commerce will have the unique distinction of dealing with the largest commercial interests of the world. In domestic exports, in manufactures, in transportation, and in internal commerce the United States is at the head of the world's list of great nations. Some figures just compiled by the treasury bureau of statistics, which by the new law becomes a part of the department of commerce, estimate the internal commerce of the country at $20,000,000,000, or equal to the entire international commerce of the world.

In arriving at this estimate of $20,000,000,000 for the internal commerce of the United States, the bureau of statistics includes only one transaction in each article produced, while, in fact, a very large number of the articles produced pass through the hands of several "middlemen" between those of the producer and those of the consumer. The estimate is based upon the figures of the census, which put the total value of manufactures in 1900 at $13,000,000,000; those of agriculture, at nearly $4,000,000,000, and those of minerals about $1,000,000,000. Adding to these the product of the fisheries, the total value of the products of the great industries in 1900 would be $18,000,000,000, and the rapid growth in all lines of industry since 1900, especially in manufacturing, seems to justify the conclusion that even a single transaction in all the products of the country would produce an aggregate for 1902 of fully $20,000,000,000.

Estimating the internal commerce of the country at former census years by the same method, it is found that the total internal commerce has grown from about $2,000,000,000 in 1850 to $3,500,000,000 in 1860, $6,250,000,000 in 1870, $7,750,000,000, in 1880 and $12,000,000,000 in 1890. It will be seen from this that the internal commerce seems to have increased 50 per cent. in the decade from 1890 to 1900, and is ten times as large in 1902 as in the year 1850.

During the same period, from 1850 to 1902, the population has increased from 23,000,000 to 79,000,000, and is therefore only three and one-half times as great as in 1850, while the internal commerce is ten times as great as at that time. This relative gain of internal commerce over population is due, in part, to the greatly increased facilities for transportation, the cheapening of cost of articles utilized, and the increased earnings and increased wealth of the people. The railroads have increased from 9,021 miles in 1850 to 201,839 miles in 1902, and the estimated wealth of the country from $7,135,780,000 in 1850 to $94,300,000,000 in 1900—a per capita increase of from $308 in 1850 to $1,236 in 1900. This increase in wealth has been accompanied by an increase in deposits in banks, those in savings banks alone increasing from $43,431,130 in 1850 to $2,597,094,580 in 1901.

Meantime the foreign commerce has made rapid increase, though not at a rate of speed proportionate to that of internal commerce. The imports of 1850 were $173,509,526; those of 1902, $903,320,948. The exports in 1850 were $144,375,726; in 1902, $1,381,719,401.

BLUE OUTLOOK ON THE CLYDE.

Labor Unions About Accepting Reductions in Wages—Few New Orders for Ships—More Boiler Trials—Scotch Ship Building Letter.

Glasgow, Feb. 7.—January is always a slack month here in the ship yards, and therefore there is nothing surprising in the fact that the launches from the Scotch yards last month were only thirteen vessels of 19,780 tons, of which ten vessels of 16,-140 tons were the product of the Clyde, two vessels of 3,450 tons the product of the Forth, and one vessel of 185 tons was the product of the Dee. The principal items were a steamer of 4,000 tons built by A. & J. Inglis for the British India Steam Navigation Co.; a shelterdeck screw of 4,000 tons built by Russell & Co. for the Nelson Line, Liverpool; a steamer of 1,890 tons built by Ramage & Ferguson, Leith, for Currie's Hamburg line; a steamer of 1,500 tons built by Barclay, Curle & Co. for Donald Currie & Co.'s line; a sailer of 2,400 tons built by John Reid & Co. for German owners; a sailer of 2,000 tons built by A. Rodger & Co. for the British & Eastern Shipping Co.; a steam turbine yacht of 1,650 tons built by Ramage & Ferguson, Leith, for Mr. A. L. Barber of New York; a harbor steamer for Constantinople; a tug for South Africa; a barge hopper steamer for the British government; and some other craft. The month's total compares with 22,800 tons last year and with over 32.000 tons in the same months of 1900 and 1899. The new contracts reported during the month amount to about 50,000 tons, but some of the orders now admitted were actually placed before the end of 1902. Among the new orders are two Union-Castle liners of 8,500 tons for the South African mail service, one each to be built by the Fairfield company and Barclay, Curle & Co.; a 4,400-ton steamer for the Union Line of New Zealand, to be built by Wm. Denny & Bros.; a cargo liner of 5,500 tons to be built by Charles Connell & Co. for English owners; a cargo liner of 1,800 tons to be built by Robert Duncan & Co. for Liverpool owners; an Anchor liner of 5,000 tons to be built by D. & W. Henderson & Co.; a coasting steamer of 3,000 tons to be built by the Dundee Ship Building Co.; a submarine mining steamer for Canada, and three suction sand-pump dredges for South Africa, to be built by Fleming & Ferguson; a coasting steamer of 2,000-tons to be built by the Campbeltown Ship Building Co.; and a number of smaller vessels.

These contracts are so far reassuring, but in the majority of yards there is a sorry look out, and before long there will be a large number of unemployed workmen. Within the last few days the ship building and engineering employers have been receiving deputations from the several trade unions wishful to discuss and argue against the intimated reductions in wages. These reductions run about one shilling per week, or one fourth of a penny per hour. The ship yard workers wanted to act in combination of unions, but though the employers received delegates in a body they will fix up with each trade union separately. The most important organization in this branch is the Boilermakers & Iron Ship Building Society, who are a well led, though an unruly body, and who are not likely to rebel against a depression which their executive officials recognize. If they submit so will the rest of the "black squad" workers. To enable the several unions to ballot their members the ship building employers have agreed to postpone the date of reduction till the middle of this month. There is considerable doubt whether the ship carpenters—"white squad"—will be allowed by their trade union to accept the reduction, because that union is largely composed of joiners engaged in wholly different trades, in which trade reductions are not proposed but would probably follow on one in the ship yards. These are the men who have struck on the northeast coast of England and have embarrassed the ship building trade unions there. They may do the same in Scotland. The engineers (or machinists as you call them) are in a separate organization and with their delegates the engineering employers had a conference this week. The Amalgamated Society of Engineers and the Machine Workers' Union are given the whole of this month to ballot their members; that is to say the date of the reduction is postponed until Mar. 2. Should the votes of the local branches of these trade unions be against the reduction the matter will be referred to a conference of the executive councils of the employers' federation and the trade unions.

SOME PARTICULARS OF NEW BATTLESHIPS.

Col. Watts, the new chief constructor for the British navy, has developed designs for battleships to be included in the navy estimates to be produced in parliament early in March. These ships will be of about 18,000 tons displacement as compared with 16,350 tons of the King Edward VII class, with 15,000 tons of the ships of the Formidable class, with 14,900 of the Magnificent class and with 14,000 tons of the Royal Sovereigns class of ten years ago. In gun power and armament these ships will mark great steps in advance. In addition to the usual barbettes right forward and aft having pairs of 12-in. guns, there will be mounted eight 9.2-in. guns, placed in pairs in barbettes at the four corners of the citadel on the upper deck, instead of four guns placed singly as in the King Edward class. There will be a dozen 6-in. quick-firers in a box battery on the main deck, with armored partitions. For armored protection the new ships will have a complete broadside of 9-in. armored for the full length of the citadel. In the King Edward class the main belt on the water line is 9 in., but it is reduced to 8 in. for the next width of plate and finally to 7 in. for the upper part of the shell. In other respects these new ships will embody improvements, for practically all the additional displacement weight is disposable for improved fighting qualities. The hull, although a little larger, absorbs very little more weight. The increased length is a factor making for greater speed. Although the King Edward VII is 2,350 tons heavier than the Duncan, the same power of machinery reduces the speed by barely half a mile per hour, 18½ knots as compared with 19 knots, a result partly of the extra 20 ft. in length. The same coal capacity gives the same radius of action.

NEW FRENCH NAVAL PROGRAM.

According to the new French naval ship building program, forty-nine vessels are to be commenced in this financial year, fifty-one are to be continued, and fifty will be completed. The total includes eight battleships, sixteen armored cruisers, one protected cruiser, twenty-nine torpedo boat destroyers, fifty-one torpedo boats, and forty-five submarine vessels. Of the battleships two will be completed, while two others in the dock yards and four in private works will be advanced. None will be laid down. Of the armored cruisers, nine will be completed, six in the dock yards will be advanced and a new vessel will be laid down. This last will be a vessel of 13,562 tons, having a length of 515 ft., a breadth of 70 ft. 6 in., and a draught of 26 ft. 10 in. With three engines driving triple screws, 30,000 I. H. P. is to be developed, to attain a speed of 23 knots. British cruisers of the Drake class, with a displacement of 14,100 tons require only 30,000 H. P. for the same speed. The French cruisers will have bunker capacity for 2,300 tons, which will give a radius of action of 1,200 miles at 10 knots' speed and 1,025 miles at full speed. The vessels will carry two guns of 9.45 in. caliber, twelve of 6.5 in., twenty-two of 1.85 in., with five torpedo-launching tubes, of which two will be under the load waterline.

An interesting feature of the French program is the submarine boats, of which nineteen are to be begun in the government works during the year; thirteen are to be continued and thirteen others completed. These to be continued embrace three different types, designed respectively by Romazzotti, Bertin and Mougas. The first is of 160 tons displacement, with a length of 121¾ ft. (and will be propelled by two propellers, driven by an internal combustion motor, and it is expected that the speed of this submarine will be 10½ knots. Another of the submarine boats has a displacement of 202 tons, the length being 135 ft. 8 in., and the speed in this case, it is expected, will be 11 knots. The third is still larger, her tonnage being 213 and her length 143 ft. 5 in. She will have a single propeller and is expected to make a speed of 10½ knots.

REPAIR SHIPS FOR BRITISH NAVY.

The British admiralty is equipping at Chatham a repairing ship called the Assistance. The ship was purchased some months ago, and the holds have been converted into the departments usual in engineering works—smithy and forge with steam hammer, foundry with cupolas, machine shops with electrically driven tools, etc., the equipment being for the formation and completion of a piston suitable for a steam cylinder about 110 in. in diameter. This ship will be attached to the Chatham reserve as a training school for the boy artificers to be created under the new Admiralty scheme. These lads are to be entered at the age of fourteen to sixteen years, and to engage for twelve years' service from the age of eighteen. They will be sent to sea in the Assistance, where they can study every description of work. A sister ship, the Hecla, is being prepared at Devonport, and she will be used for the same purpose as the Assistance, and be associated with either Portsmouth or Devonport reserves.

TIME REQUIRED TO BUILD SHIPS OF WAR.

Some inquiry has been made in Germany as to the time taken in building warships, and the facts prove that Britain can afford to wait until we know all about the design of foreign ships before commencing to prepare the building of vessels to excel them. The Kaiser Karl der Grosse, a battleship built by Messrs. Blohm & Voss at Hamburg, took 40 months and 5 days to build. She is a vessel of 377 ft. 4 in. in length, 11,150 tons displacement, with four 9.4-in. and eighteen 5.9-in. guns, and with engines of 13,000 I. H. P., to give 18 knots speed. The Wittelsbach, a ship of similar size, took about the same time in the imperial dock yard at Wilhelmshaven. The Zahringen occupied 35 months at Krupp's Germania yard. And the Wettin took 35 months and 7 days at Schichau's yard at Elbing. For much larger battleships built in Great Britain, 33 months from the order to the commission is adequate, and some ships have been handed over in less time. The German ships are not equal to the Chilian battleships recently launched, and the Libertad could have been commissioned in seventeen months from the signing of the order. In British practice it sometimes happens that the order for armor and guns is not placed until six or nine months after the keel has been laid, and in such cases work is delayed, but under the decentralizing scheme at the admiralty, with a separate superintendent of naval contracts, there will be an improvement in many respects.

FURTHER HYACINTH-MINERVA BOILER TRIALS

In a former letter I referred to an intended series of further boiler and speed trials by the Hyacinth and Minerva. These

vessels are now leaving for Gibraltar, and the program to be carried out is somewhat similar to, although with important differences from, the trials of a few months ago. The tests will be under the direction of admiralty officers. The Hyacinth has been fitted with new propellers of increased surface since the last trials, when, with engines of greater power, the speed of the ship was less than that of the Minerva. These propellers give about a quarter of a mile per hour more speed. Both vessels will leave England with the same quantity of coal and of feed water on board, and will steam south at 7,000 I. H. P., continuing as long as the coal lasts. This will determine the actual coal endurance of the ships. On the former trial neither ship went to the utmost limit, owing to the choking or bird-nesting of the tubes in the cylindrical boilers of the Minerva and to water leaking from the Belleville boilers of the Hyacinth. When their coal is exhausted they will put into Gibraltar, and at once prepare for the return journey. The time required for such preparation will be an element in the contest. Both ships will leave together and the return run will be a speed contest. It has been decided to hand over the Hermes to the boiler committee for a series of exhaustive trials with the new boilers of the Babcock & Wilcox type. The Hermes is a sister ship to the Hyacinth, with engines of 10,000 I. H. P., and is the largest vessel completed with this type of boiler. The results will be compared with those got with the Hyacinth and Minerva with Belleville and tank boilers respectively. The boiler committee is engaged in trials with the Medea and Medusa, having large-tube Yarrow and Durr boilers.

Messrs. J. & A. Allan of the Allan and State lines of Canadian and American steamers have purchased the steamers South Point and Orient Point, which were built on the Clyde last year to the order of the Norfolk & North American Steam Shipping Co. The gross tonnage of each is about 4,200. These vessels were fully described in former letters, and their rapid transfer to new owners is here noted as a matter of interest.

NEW PLEASURE CRAFT.

The Marine Construction & Dry Dock Co. of Mariner Harbor, Staten Island, New York, has secured the contract for building an auxiliary, bugeye-rigged yacht for the well-known mining engineer, Mr. A. A. Blow of London, England, which he intends to use the coming season in cruising in and about the waters of Chesapeake bay. Dimensions are: Length, 56 ft. over all; 44 ft. load water line; 11 ft. 6 in. beam and 4 ft. maximum draught, with center-board of 4 ft. drop. Auxiliary power will be furnished by a 20-H. P. gasoline engine, which is calculated to drive the boat at a speed of 11½ miles per hour without aid of sails. She will have two masts, carrying jib, staysail and mizzen sail, in all about 1,700 sq. ft. of canvas. She will have overhanging bow and stern with a low trunk cabin. Her engine room will be well aft affording ample cabin space, which will be divided into fore-and-aft cabins, finished in mahogany with ceilings in cream enamel and gold trimmings. The after cabin will be fitted with sliding seats and the forward cabin with Pullman bunks which will let down from the sides. Immediately forward of the cabin will be a 6-ft. pilot house and accommodations for the crew. The aft companionway leads to a spacious passage, which will be the galley, while in similar space on the port side will be the toilet accommodations. The gasoline tank, with capacity of 125 gallons, will be located forward, and, in order to eliminate all danger from leakage of gasoline will be protected by two watertight bulkheads, to which pipe connections will be made at the water line, permitting a free flow of water in and out, thus carrying off any gasoline which might escape from the tank. The specifications call for fittings and furnishings complete, including carpets, curtains, hangings and furniture. The boat is to be ready for delivery in May.

This company is also building a steam yacht for F. D. Underwood, president of the Erie railway, which is well on towards completion. Joiner work is now being put in. This boat is 116 ft. over all and is calculated to make not less than 12 knots per hour. She is being made extra strong and heavy for her dimensions, making here more than ordinarily seaworthy, so as to enable her owner to take extensive cruises.

SHIP BUILDING AT NEWPORT NEWS.

Newport News, Feb. 18.—The Newport News Ship Building & Dry Dock Co. will launch the large armored cruiser West Virginia in April. The ship is now 45 per cent. completed. The keel of the new 16,000-ton battleship Louisiana has been laid at the yard and work on the vessel is progressing rapidly. There is considerable material on hand for this vessel. The Connecticut, sister of the Louisiana and building at the Brooklyn navy yard, will not go down on the ways before April.

The steamship Harry Luckenbach will leave the yard in a few days after being laid up here several months being converted into an oil carrier. The steamship S. V. Luckenbach was also converted into an oil carrier and is now taking on a cargo of oil at Philadelphia. Both ships have been chartered by the Luckenbachs to oil companies. They are equipped with burners for the consumption of oil as fuel. The contract price for converting these vessels from cargo carriers into oil carriers amounts to nearly $200,000.

The ship yard has had considerable repair work in the past few weeks and the dry docks have been kept pretty busy. Half a dozen large steamships have been here for surveying in dock and repairs and a number of smaller vessels have received attention. Among the vessels repaired were the steamships Daventry and Garlands which grounded near Hatteras within a few days of each other.

The new Old Dominion steamship Monroe, building for the Old Dominion Line between Newport News, Norfolk and New York, will be completed and ready to go on the line the latter part of March. She will be given a trial run between Hampton Roads and New York immediately. The Monroe will be the largest and costliest ship in the Old Dominion fleet and the occasion of her maiden trip will be quite an event with the officials of the steamship company. The Pacific coast lumber steamer Francis H. Leggett will be completed about the same time.

Little has been heard in the past few weeks about the Norfolk and Hampton Roads Ship Building & Dry Dock Co., which proposed to build a large ship yard at Sewell's Point, opposite Newport News. The company has purchased 700 acres of land on Hampton Roads and has cleared about seventy acres, on which it was proposed to build the yard. It is understood that plans are in course of preparation, but little is being said about the company's intentions.

At the navy yard all is activity, a number of vessels being in the hands of the workmen. The cruiser San Francisco, the largest, is having her boilers jacked up as they were out of plumb. Owing to difficulty in securing good mechanics, it is understood that there will be advances in wages in certain trades employed at the yard. An examination for carpenters on this naval station was held at the navy yard Tuesday. The torpedo boat destroyer Bainbridge went in commission Saturday.

NEW AMERICAN SHIP MOVEMENT.

Editor Marine Review:—Notwithstanding the efforts of Senator Hanna to resurrect in the house the ship subsidy bill passed by the senate that measure is as dead as codfish, salted, dried and sold any old place at 5 cents a pound. Eleven Republicans and six Democrats compose the committee on marine and fisheries and yet the bill was stuck with such a committee. The real movement in the interest of the American ship is foreshadowed in the following concurrent resolution introduced in the house recently by Representative Sulzer:

"Sec. 1. That a joint committee of the two houses be appointed to investigate our present policy of international navigation, to trace its effects upon our merchant marine, to consider how we may constitutionally encourage it in foreign trade and thereby regain our lost position at sea, and to report to the senate and house, respectively, identical bills calculated to effect with certainty a renewed development of American shipping power.

"Sec. 2. That the said committee shall consist of seven members of the senate, four from the side of the majority and three from the side of the minority; and of ten members of the house, six from the side of the majority and four from the side of the minority, seventeen in all; to whom shall be added the president of the senate, who shall be chairman. A quorum of committee shall consist of twelve members; the measure to be reported shall be supported by at least fourteen members; vacancies on the committee happening before or during its sessions shall be filled by appointment of the chairman from the membership of the senate or house from either political party, as the case may require.

"Sec. 3. That the committee shall sit in Washington in the month of May, 1903, before whom letters and briefs may be presented and considered or experts examined; expenses of the committee, including clerical services, stationery, printing, cost of travel and subsistance, and railroad fares and hotel expenses of persons that may be called, as the chairman may determine, to be defrayed by the government."

Mr. Sulzer, the sponsor for this resolution, is a Democrat and may be the floor leader in the next congress. The day after this resolution was introduced, Mr. Green of Massachusetts, a Republican on the marine committtee, who had subsidy predilections, introduced another resolution of same tenor and object, in fact differing little from the first one. One of these will doubtless be reported favorably and pass the house, if not senate also, before adjournment in March. This movement means business on the early lines of action. The present ruinous navigation policy will be discontinued and the original and constitutional policy re-instated, probably by the next congress, as should have been done by the session following the inauguration of Wm. McKinley. The intervening time has been lost experimenting with subsidy bills. Seven Republicans could at any time have reported the pending bill favorably, yet out of eleven this number cannot be obtained. If five out of eleven Republicans will not vote for subsidy in the house, it is believed that a proportionate number would not in the country. This would be about 45 per cent. of the G. O. P.!

With subsidy fooling out of the way, congress will either do the proper thing or give up the sea to the Europeans.

SHIP'S FRIEND.

BRITISH SHIPPING MATTERS.

London, Feb. 9.—The most striking event in shipping circles during the past few days has been the inspection made by the officers of the Chilian government of the water-tube boilers which have been constructed by Yarrow & Co. at Poplar for the two Chilian cruisers now being constructed by Armstrong, Whitworth & Co. at Elswick and Vickers, Sons & Maxim at Barrow. The boilers for the Elswick-built ship were particularly objects of the Chilian inspection. It is, of course, well known that the Yarrow boiler is of the small tube or "express" type. For fitting in larger vessels the original design introduced in torpedo craft has been modified. At first the tubes were 1 in. in diameter, and this gave a very light, quick steaming boiler, suitable for its special purpose, and it is, of course, well known that remarkable speeds were obtained. It was felt, however, that for larger vessels linings must to some extent be sacrificed, and the diameter of the tubes was accordingly increased to 1¾ in., a size which may be compared with the 4-in. and 4½-in. tubes of the large horizontal tube boilers, such as the Belleville and other makes. There is much to be said for the Yarrow as compared with the horizontal tube. About seven years ago Yarrow & Co. fitted their small-tube boiler into three large cruisers for the Dutch government. These were tried in conjunction with cylindrical boilers, the Dutch engineering authorities, by way of precaution, putting a small proportion of the latter in the ships, much as our admiralty are doing at present. Two years later the same government constructed three more large cruisers, and in each of these the whole of the steam was supplied by Yarrow boilers. Since then an armor-clad vessel in which all the boilers are of this kind has been built and two others are under construction. The Austrian navy has also had several vessels fitted with this boiler, there being three large cruisers completed and one building as well as three armor-clad vessels, each of 14,000 H. P. The Swedish, Portuguese and Norwegian navies also have adopted Yarrow boilers entirely for several cruisers and armor-clad ships.

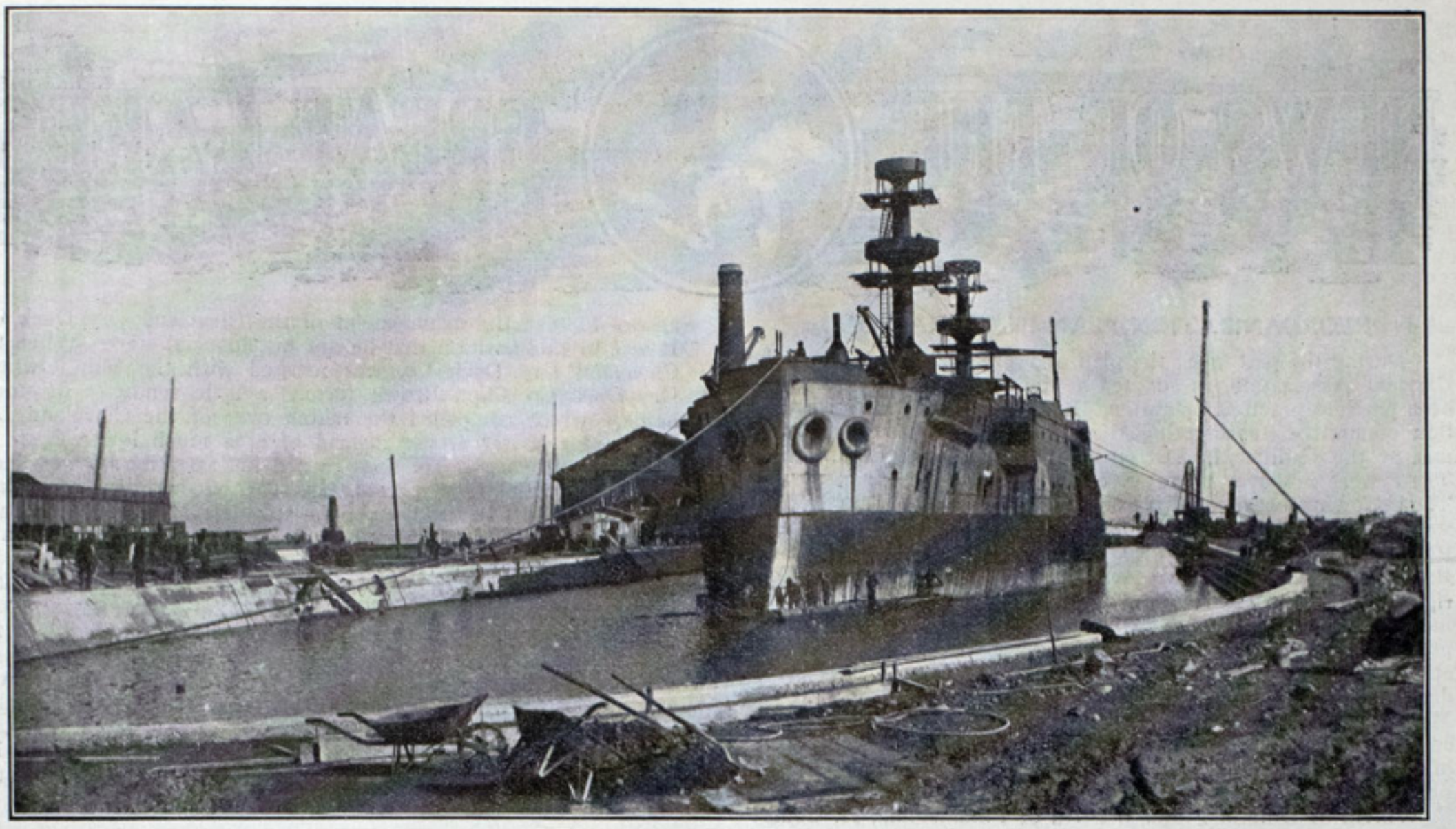
Already a start has been made by the British admiralty in the same direction. Four cruisers, according to the present program, are to be fitted with Yarrow boilers whilst in the program arrangements are made for the use of the Thornycroft boiler. The chief distinguishing characteristic between the Thornycroft and Yarrow types is that the former has bent tubes and the latter straight ones. A great advantage in straight tubes is that they can be inspected in the interior *in situ*. One of the tests at the inspection was the passing of an electric lamp down the tube to examine the base though of course with ample daylight the lamp is not needed. Mr. Yarrow stated that 1¾ in. diameter is large enough for all practical purposes and indeed any further increase in size is objectionable. The total power in each of the Chilian cruisers will be 12,500, and each ship will have twelve of the Yarrow boilers placed three in a group in four stokeholds. Each boiler will therefore give steam for over 1,000-H. P., and for this 3,000 ft. of heating surface has been provided. The proportion of heating surface to horse power is about 3 sq. ft. to each unit. This is a more liberal allowance than is usually given with water-tube boilers for large vessels, and it will permit of steam being generated for full power with three-quarters of the boiler capacity being used, so that if the engines will take the steam a much higher power than the designed full power can be reached. It would appear that the limit allowed for weight was the standard requirement for Belleville boilers, and as there was no object in going below this, Yarrow & Co. determined to use their allowance in strengthening the casings, uptakes, etc., and giving ample heating surface. It may be pointed out that vertical-tube boilers can be forced with impunity, whilst it is not possible to force the Belleville boiler to any considerable extent. In consequence of the excellent circulation, which increases with the forcing, there need be no fear of burning the vertical tubes, and for this reason there is always a large reserve of power for emergencies, such as a case of boilers being put out of action in a naval battle. It is, however, estimated by Yarrow & Co. from previous experience that in ordinary times these modified small-tube boilers "should remain in thoroughly good condition during a period corresponding to two commissions of three years each." The grate area in these boilers is somewhat less than usual. Mr. Yarrow is of opinion—and in this he is in agreement with many engineers—that it is better, both on account of economy and for the comfort of the stokers, to have a comparatively small grate and force the fires by fan draft, rather than have a big grate and slower combustion. The blowing of the fire causes the air and fuel gases to be more thoroughly mixed in the combustion space, and thus leads to economy.

The Liverpool Steamship Owners' Association in their annual report are up in arms against the British government, and present their grievances with considerable lucidity and vigor. The report states that the nation has during the past year realized, perhaps more keenly than it has ever done before, the nature of the struggle in which the British ship owner is engaged to maintain the position of the country as the sea-carrier of the world. The British ship owner is handicapped not only by the protection given to foreign competitors by their own countries but by unfair advantages given to foreign ships in our own ports. The report declares that so unequal a fight cannot long be maintained, and that the issue is whether the British ship owner is to be driven from the field or whether our laws are to be altered to place him in a position of equality with foreign competitors. The report attacks the code embodied in the merchant shipping act of 1854, under which British shipping is controlled. Substantially that code has not been altered by subsequent amendment of the act. The report declares it to be obsolete, inasmuch as during the last fifty years both the class of vessels and the nature of their employment have altered. Nevertheless every new improvement in type of ship has to be brought within the old law; and the ship owner is in many cases compelled to adhere to practices which experience has shown to be capable of improvement, whilst the country is risking incalculable injury to its general trade by insisting on the shipping industry being governed by obsolete rules and regulations. For example, the passenger and emigrant regulations now in force are, in the main, those of 1855. A modern 20-knot vessel has still to be equipped and provisioned for the same length of voyage as the vessel that was making the same voyage in 1855. The law of 1855 divided steamships into two classes, the first having a speed of at least 5 knots an hour, and the second of at least 10 knots an hour. There are no ocean steamships afloat at the present time of only 5 knots an hour, and there are no ocean passenger steamships of only 10 knots. Still the law stands, and voyage after voyage the ship owner has to see his money wasted in complying with it. In many other respects the law is altogether inapplicable to the existing types of vessel engaged in the trade, and grave and constant injustice is committed by forcing the specially-built and equipped modern passenger vessel to comply with its provisions. No other nation, it is declared, hampers its passenger and emigrant trade in the same way. It is, of course, essential that all necessary steps should be taken to secure safety of life, of cargo, and of the ship itself, but regulations to this end, it is urged, are as applicable to foreign as to British ships, and it is anomalous to enforce them against British ships only. The report gives instances of this differential treatment. Both British and foreign ships bringing deck cargoes of timber to this country have to comply with the same regulations, but in regard to incoming grain vessels, they are enforced only against British ships. Regulations as to unseaworthiness and passenger-carrying are also differentially applied. Replying to the possible argument that if British regulations are enforced on foreign ships foreign governments will retaliate, the association doubts if this is a real risk; but whatever it may amount to, if it is not faced the country must be prepared for further transfers of British shipping to foreign flags, for it is idle to expect that the British shipowner will be able for long to compete, even in his own ports, with vessels that are manned and equipped at far less cost, and that carry more cargo than precisely similar British vessels.

MR. SWANK'S SOUVENIR OF THE IRON TRADE.

Mr. James M. Swank has completed his thirtieth year of service with the American Iron & Steel Association, first as secretary and then as general manager. He has done more than any dozen men to preserve the industrial history of the United States as related to iron and steel. As a souvenir to mark the completion of his thirty years of service he has compiled in convenient form the iron and steel, iron ore and coal statistics for the United States and European countries. The table of contents of the compilation is as follows: Production of coal in the United States; production of coke in the United States; shipments of Connellsville coke; shipments of Pocahontas flat top coke; production of iron ore in the United States; production of Cornwall iron ore; shipments of Lake Superior iron ore; imports of iron ore into the United States; shipments of iron ore from Cuba; production of pig iron in the United States; production of Bessemer steel in the United States; production of open-hearth steel in the United States; total production of steel in the United States; production and prices of Bessemer steel rails in the United States; production of pig iron in Great Britain; production of coal in Great Britain; production of iron ore in Great Britain; production of Bessemer steel ingots in Great Britain; production of open-hearth ingots in Great Britain; total production of steel in Great Britain; production of iron ore in Germany; production of pig-iron in Germany; production of coal and lignite in Germany; production of finished steel in Germany; production of iron ore in France; production of finished steel in France; production of Bessemer and open-hearth steel ingots in France; production of coal and lignite in France; production of iron ore in Algeria; production of pig iron in France; production of iron ore in Belgium; production of pig iron in Belgium; production of steel ingots in Belgium; production of finished steel in Belgium; production of coal in Belgium.

Gross earnings of the Pittsburg & Lake Erie Railway (iron ore road) for 1902 were $10,098,706.89 or $54,422.87 per mile. This is said to be the heaviest gross earnings per mile of any railway in the country.



Docking the Battleship Ohio in the New Dry Dock of the San Francisco Dry Dock Co., at Hunter's Point, San Francisco.

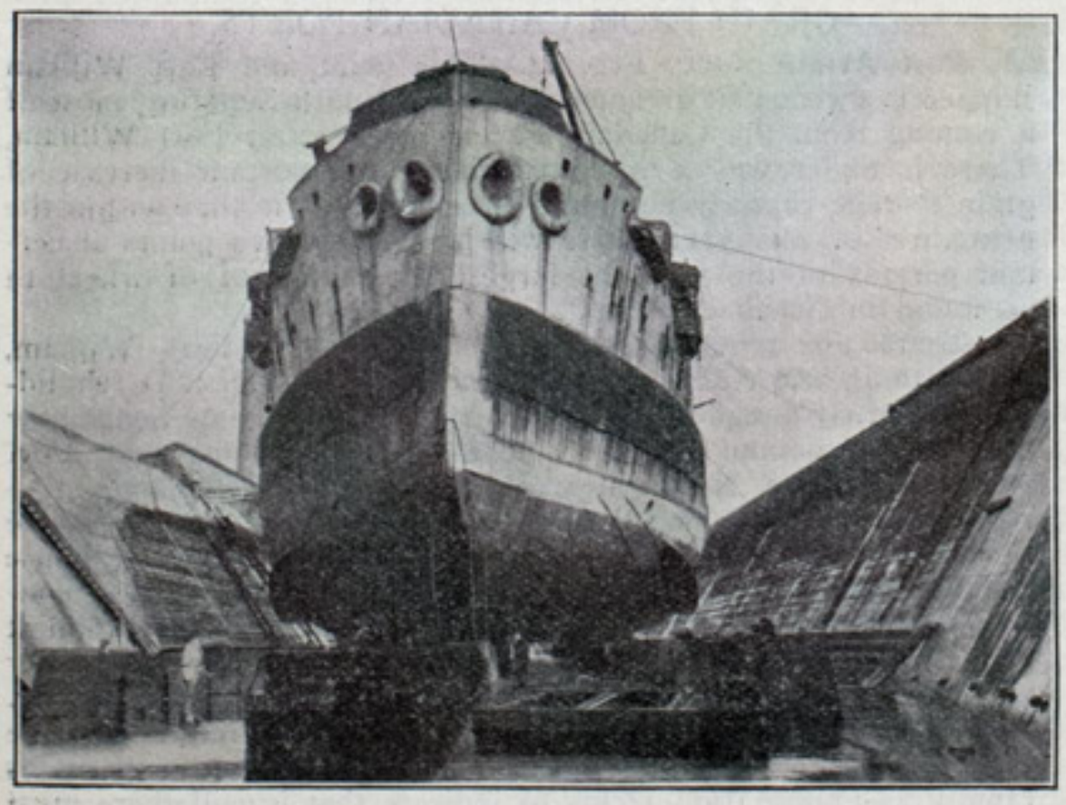
NEW DRY DOCK AT HUNTER'S POINT.

San Francisco now possesses a dry dock capable of accommodating the largest vessel in the world. It was begun about two years ago by the San Francisco Dry Dock Co. at Hunter's Point and has just been completed. It is one of the largest and best equipped dry dock in the world, being 750 ft. long, 122 ft. wide at the top and 80 ft. wide on a level with the top of the keel blocks. There are 28 ft. of water over the sill of the dock at high tide. It was built by Mr. Howard Holmes and is an enduring monument to his skill. The dock was officially opened in the presence of the president and directors of the dry dock company and about a hundred others, on Thursday, Jan. 29, to receive the United States battleship Ohio, which has been under construction at the Union Iron Works, San Francisco, for nearly three years. The Ohio is 393 ft. long, 72.2 ft. wide, weighs about 8,000 tons and draws 17 ft. of water. When she has her full crew, armament, stores, ammunition and coal on board, she will displace 12,440 tons. She was launched by the late President William McKinley during his visit to the Pacific coast on May 18, 1901.

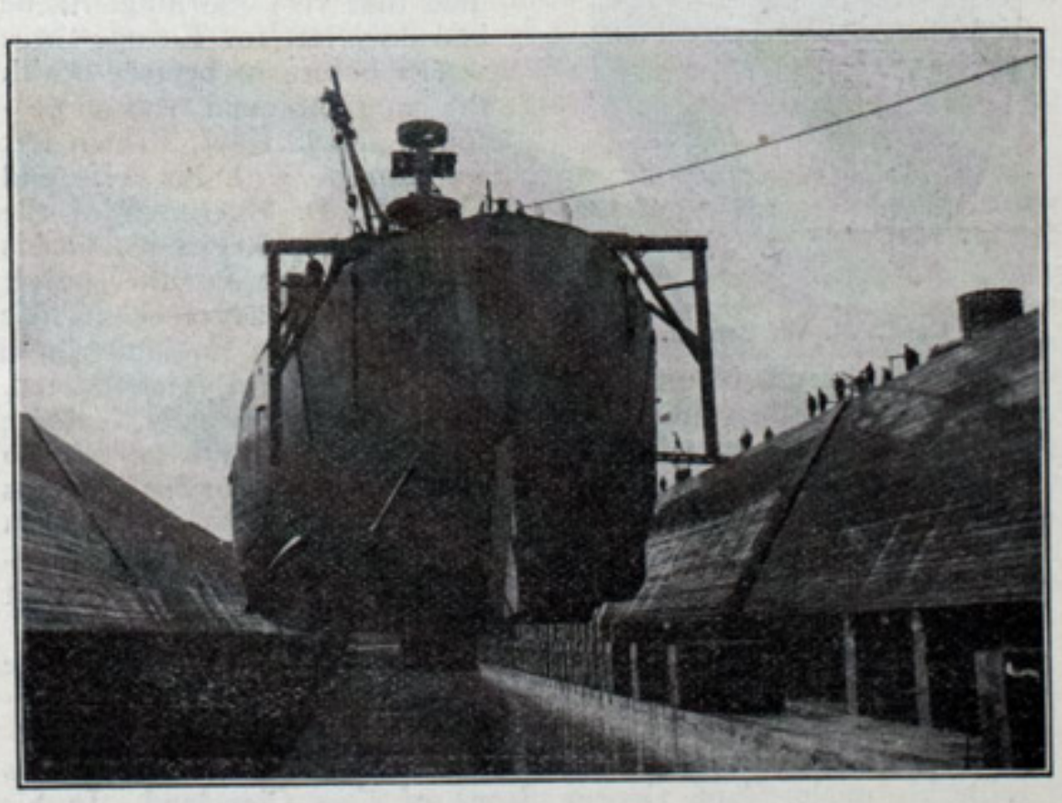
The operation of the dock was in charge of John Habacher, the dock engineer, and J. J. Beaton, the dock superintendent. The battleship was towed from her moorings by the tugs Sea Queen, Sea Fox and Sea Rover, which brought her from the Union Iron Works to Hunter's Point. The big gate of the dock was floated away at 11:38 a. m., and the hydraulic pumps were set to work at 12:45 p. m. The three pumps discharged together 120,000 gallons per minute, and at 2:50 p. m., the battleship stood dry and comparatively clear on the keel blocks. Though the vessel had not been docked for ten months she was not so dirty as had been expected. She has since received two coats of anti-fouling paint and her immersed body has been thoroughly overhauled.

As the Ohio entered the dock there were 11 ft. of water between the sill of the dock and her keel, and as she lay on the blocks after the water had been pumped out there were 4 ft. to spare on either side at the narrowest part of the dock. Between her stern and the dock gate there was space to dock another vessel of more than 300 ft.

The docking of a warship is one of the most difficult operations that concern such a vessel. Every detail entering into the question must be carefully considered beforehand for unless the strain is evenly distributed the bottom plates are likely to buckle and damages follow that will cost thousands of dollars to repair. A copy of the plans of the vessel is given to the officer superintending the docking and the position of the blocks that are to support her is calculated with precision. The stationary blocks must confirm to the curve of the keel and the heavy blocks above these must be placed so as to enable the vessel, when the water is drawn off to rest evenly and free from strain. The vessel is then towed up to the dock, the dock gate is floated away and the ship warped in till her bow and stern rest exactly on lines the ends of which are marked by stakes driven into the ground on either side of the dock. The gate is filled with water and sunk until it rests snugly on the rubber cushions of the sill. The great hydraulic pumps are set in motion and, as the water is drawn out, men swarm round the vessel to scrape and brush off the barnacles and sea plants that have accumulated on her bottom. By the time the bottom touches the blocks it is clean.



Bow View of the Ohio.



Stern View of the Ohio.

NEWS OF THE GREAT LAKES

REORGANIZATION PLAN IN OPERATION.

During the past week the plan of reorganization of the Lake Carriers' Association, as adopted at the late annual meeting, has been put into practical operation. Last Thursday the reorganization committee, representing the stockholders through proxies, met at the Cadillac in Detroit and perfected the organization. There were not over twenty-five stockholders present in person. The following board of directors was chosen: William Livingstone, C. W. Elphicke, D. Suillivan, David Vance, F. J. Firth, Edward Smith, T. T. Morford, C. A. Eddy, W. C. McMillan, A. B. Wolvin, D. G. Kerr, W. W. Smith, H. Coulby, James Corrigan, H. A. Hawgood, J. H. Sheadle, John Mitchell, T. F. Newman, W. W. Brown, J. E. Upson and George P. McKay. As predicted there was no change in the officers, the following being elected. President, William Livingstone of Detroit; vice-president, J. H. Sheadle of Cleveland; treasurer, Capt. George P. McKay of Cleveland; secretary, Harvey L. Brown of Buffalo; and counsel, Harvey D. Goulder of Cleveland. The greatest interest, of course, centers in the executive committee which is to do the real work of the association. This committee is as follows: A. B. Wolvin of Duluth, Frank J. Firth of Philadelphia, H. Coulby of Cleveland, H. A. Hawgood of Cleveland and Edward Smith of Buffalo.

During the present week the executive committee has held conferences of a preliminary character with the representatives of the seamen's union and purposes to arrange a schedule of meetings with the representatives of labor unions having to do with the actual work of the great lakes. It will be probably two weeks before the executive committee will have a full meeting and be prepared to take final action. The committee will not treat with any representatives of labor which have not full power to act—that is they will not treat with a committee which would have to report its findings back to the union for ratification. The labor committee must be clothed with authority to close contracts. The headquarters of the executive committee are to be at Nos. 212 and 213 Western Reserve building. There has been some discussion as to the salary which the president is to receive but this amount has not been determined upon yet. It is likely that the executive committee will receive $20 a day for the time in which they are actually employed and railway expenses besides. Of course no action has, as yet, been taken upon the shipping offices but it is probable that they will be continued though considerably curtailed in extent.

DEATH OF CAPT. W. W. BROWN.

Vessel men and others associated with the lake trade were shocked upon receiving a cablegram from Rome last week conveying the brief announcement that Capt. W. W. Brown had died there. The cablegram was from Capt. F. D. Herriman to Burton Ayers, Mr. Brown's private secretary, on Friday morning last briefly saying that Capt. Brown had died that very morning. As he had only left for Europe three weeks before in perfect health the announcement was a profound shock. Capt. Brown left for Europe with his wife and Capt. F. D. Herriman of the Great Lakes Register and his wife to inquire into the subject of marine insurance. Their destination was England where the great marine insurance business of the world is conducted. They had doubtless finished their business and had gone to Rome merely for a holiday. They had been in Rome only a day or two when Capt. Brown suddenly expired. The cause of his death is merely a matter of conjecture. The telegram said nothing upon the point. Two causes are advanced—one a certain fever prevalent in Rome owing to the bad water supply and the other heart failure. The remains will be brought home by way of Naples.

Capt. W. W. Brown.

Capt. Brown died upon the very threshold of success. He was born at St. Williams, Ont., Nov. 25, 1858, and went to Cleveland when he was about twenty years old. He engaged in mercantile work for a little while and then went sailing on the lakes with his uncle, Capt. George Stone of East Cleveland. In his career as a sailor he reached the post of master. In 1895 he came ashore to take the management of the Cleveland Dry Dock Co. It was in this position that he got his financial start. When the Cleveland Dry Dock Co. was merged with the Ship Owners' Dry Dock Co. Capt. Brown formed a little syndicate of stockholders which compelled the taking over of the Cleveland Dry Dock Co.'s shares at par instead of at a much lower figure as originally proposed. He then turned his attention to vessel organization with great success. In 1901 he organized the Globe Transportation Co. and bought the steamers Mentor, Eureka and Tampico from Messrs. W. A. and Arthur Hawgood. He also succeeded in interesting Lyman C. Smith of Syracuse, N. Y., and other capitalists in vessel property and organized the United States Transportation Co. which has a capital of $3,000,000. During the past two years he placed orders with lake builders for twelve modern vessels. Six of them have been delivered and six are now on the stocks. Mr. H. S. Wilkinson of Syracuse, who was associated with Capt. Brown in many enterprises, said that Capt. Brown had only got fairly started and that he could obtain from capitalists whatever sums of money he required for his enterprises. The death of any young man is to be mourned; the death of a young man with such a future is a calamity.

NEW DIPPER DREDGE—SHIP YARD LABOR.

Duluth, Minn., Feb. 17.—The Duluth Dredge & Dock Co. of this city, owners of the large dipper dredge Napoleon launched two years ago, has just launched a second big machine. It is slightly greater in power than the Napoleon, though with the same sized dipper, 8 yds. capacity. The dredge is 135 ft. long, 41 ft. beam and 14 ft. deep, and, with two very large dump scows, cost $135,000. The machinery is from the Bucyrus works, who also furnished that for the Napoleon. The frame of the boat is of fir and oak, and is of immense strength. This will give this company four very large and modern dredges and ten large dump scows. Two of its smaller dredges were sold to Canadians last year.

The total labor employed at the yard of the Superior Ship Building Co. is now about 1,500 men and this will be increased about 250 or 300 a little later. Frames of the four ships under way are going up and plating is started. The many ships in the yard for overhauling are all well along and the engine work on the Pittsburg boats there is progressing very rapidly. It is not probable that any launching will occur at this yard before June next.

Capt. D. D. Gaillard, United States engineer, is letting contracts for the new concrete piers at the Superior entry as fast as possible, and will soon have all the south pier contracted. The cement has been bought of the Illinois Steel Co., dredging by the Lake Superior Dredging & Contracting Co., piling for foundations by Hugo & Tims, Duluth, and the bids for concrete construction will soon be in, having been called for Mar. 9.

Flour warehouses at the head of the lake are pretty well filled with flour for lake shipment. Grain in store is coming in slowly and flax is going forward by rail nearly as rapidly as it is received. Large quantities of barley are now coming in, as also of oats.

GRAIN FROM CANADIAN PORTS.

Port Arthur, Ont., Feb. 14.—This point and Fort William shipped last year half as much wheat as Duluth-Superior, most of it coming from the Canadian Pacific elevators at Fort William. There is under way a very material and important increase of grain storage capacity here, and the prediction is that within the next three or four years there will be at these two points at certain periods of the year the largest accumulations of wheat to be found in North America.

There are now elevators as follows: At Fort William, Canadian Pacific A, B and C, capacity 4,000,000 bu.; D rebuilding and nearly completed, 3,000,000 bu.; and E, a new house now under construction, 3,500,000, total 10,500,000 bu. At Port Arthur Canadian Northern working house and tile annex, 3,250,000 bu., King's wheat hospital 350,000, total 3,600,000 bu. The Canadian Northern is to build at once another working house and tile annex to hold 3,000,000 bu. and J. C. King has let contracts for a 500,000 bu. addition to his elevator, making a total at Port Arthur of 7,100,000. There is thus completed and under way at these two adjoining points 17,600,000 bu. grain capacity. It is supposed this will be ample for some little time, but if the grain growing territory of the Canadian northwest increases as rapidly as immigration seems to indicate that it will there must be still more capacity here shortly. The growth of these two

points as wheat centers is following that of the American head of the lake at Duluth and is caused by the same conditions the rapid filling up of good wheat growing land to the west.

AT LAKE SHIP YARDS.

Mr. H. A. Hawgood of Cleveland has just closed contract with the American Ship Building Co. for a new modern steel steamer to be equipped with triple-expansion engines and Scotch boilers and to be capable of carrying 6,200 tons of iron ore on 18 ft. draught. The steamer will be built at the West Superior yard of the ship building company. This is one of the contracts referred to as pending in the last issue of the Review.

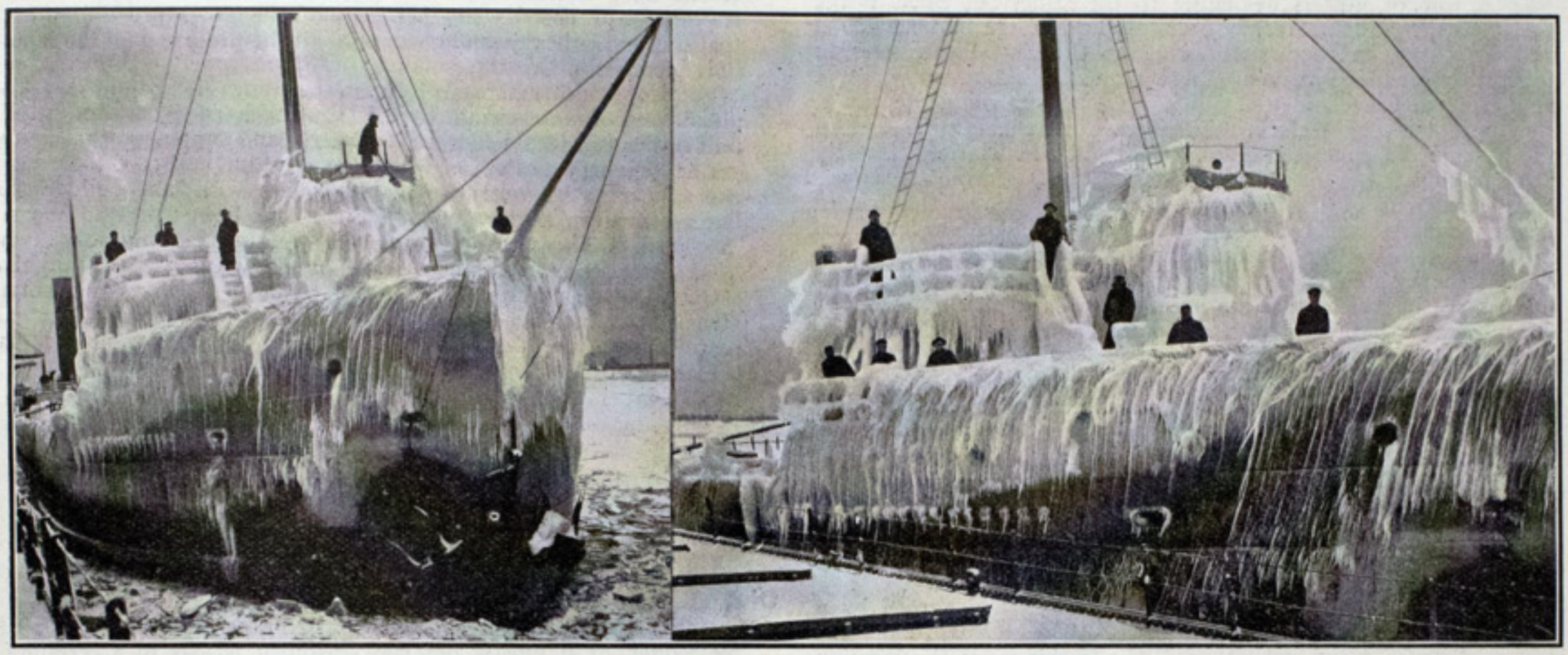
A contract has also been closed with the American Ship Building Co. for a so-called car ferry for use on Lake Erie to be run in connection with the Pere Marquette railroad. The plans for this steamer were projected by the Lake Erie & Detroit River railway with terminals at Port Stanley and Sarnia before it passed under the dominion of the Pere Marquette railroad. The steamer is intended to run between Conneaut and one of the three Canadian ports on Lake Erie touched by this railway, probably Port Stanley. She will be fitted with tracks similar to a car ferry, upon which coal cars will be run and their contents dumped into the hold. It is not the purpose to ferry thte cars across the lake. The receiving docks on the Canadian side will be fitted with clam-shell hoists. The tracks will be made to fold so as to form an almost continuous hatchway for the operation of the clam-shells. The new vessel is to be ready by next winter. Plans for this vessel are being drawn by Mr. Frank E. Kirby of Detroit. In addition there are other orders on the tapis at lake ship yards.

The Jenks Ship Building Co., Port Huron, Mich., has just closed contract for the construction of a steel steamer to be a duplicate of the John P. Cowle in everything except length. The new steamer will be 20 ft. shorter than the Cowle or 410 ft. in length. The Cowle was delivered last fall. It is not as yet announced for whom the vessel is building.

The steel steamer Hurlburt W. Smith was launched last Saturday at the Lorain yard of the American Ship Building Co. with flags at half-mast in memory of Capt. W. W. Brown, the late managing owner of the fleet to which the steamer belongs. The steamer was christened by Mrs. Hurlburt W. Smith of Syracuse, N. Y. The new steamer is 434 ft. over all, 414 ft. keel, 50 ft. beam and 28 ft. deep. She will have triple-expansion engines with cylinders 22, 35 and 58 in. in diameter with stroke of 40 in. Steam will be supplied by two Scotch boilers 13 ft. 2 in. in diameter and 11 ft. 6 in. long, equipped with Ellis & Eaves draft. The appointments of the Smith are of an unusual character as her interior is arranged for the accommodation of the directors of the company.

The Ottawa Forwarding Co., is building at Ottawa a steamer 112 ft. long, 23 ft. beam and 8 ft. depth of hold, to be fitted with fore and aft compound engines, and capable of carrying 250 tons of cargo, for the Ottawa-Montreal trade. This is the first steamer built at the canal basin, Ottawa, for four years, and is the first steamer on Ottawa river in the construction of which Pacific coast timber has been employed.

There is likely to be a large addition to the number of Canadian bottoms on the great lakes this year. In addition to the two under construction at Collingwood for the Playfair Co. of Midland and the St. Lawrence & Chicago Transportation Co. Glasgow, Scotland, and one at Newcastle-on-Tyne, Eng., for Canadian owners. The Algoma Central Railway Co. is looking for a new steamer for one of its freight and passenger runs; the recently organized Inland Lakes Transportation Co. is about closing a deal for three old Baltic sea grain carriers in England, and the Western Navigation Co., just formed, is negotiating in England for one or more freight carriers for service on the upper lakes. Hamilton owners are also enquiring in the British market for suitable vessels for the lake trade, so that if all the promises are fulfilled there will be something like fifteen additional Canadian owned vessels seeking freight cargoes almost entirely on the upper lakes. In connection with these additions to the Canadian lake marine it is of interest to note that the Canadian ship builders recently waited on the Dominion government to ask for an additional encouragement to ship building in the Dominion in the shape of a bonus equal to the amount of duty paid



AFTER A LATE TRIP UP THE FULL LENGTH OF LAKE SUPERIOR.

Pictures showing the great quantity of ice formed on the decks and deck houses of the Peavey company's steamer F. T. Heffelfinger during a late run last season from the Sault to Duluth.

of Toronto, respectively, and the one being built by the Bertrams at Toronto for the Victoria Lumber Co., two are being built at on imported materials for ship building. At present a British registered vessel can engage in the coasting trade of Canada, whether British or foreign built, the only exception being that foreign built vessels given a British registry since September, 1902, are liable to a duty on seeking to engage in the Canadian coasting trade. Large quantities of the materials used in shipbuilding have to be imported and duty paid thereon, consequently a Canadian ship builder cannot compete with the British yards, seeing that the completed ship comes in duty free. That the ship builders are not alone in asking for the re-adjustment of the law in this respect, is evidenced by the passing of a similar resolution by the National Association of Marine Engineers of Canada at its annual meeting at Montreal, Jan. 29. A relief to the extent asked for would be a great encouragement to ship building in Canada. The yard at Collingwood, Ont., has been fairly successful since it started and with a readjustment of the coasting regulations placing Canadian and British builders more on an equality, it would be more successful and the new yard of which Mr. Angstrom, late of the Bertram yard, is to be manager, will also find plenty of work. The location of this new yard has not been definitely settled, but it is understood that it will be at Sarnia, Ont.

It is probable that the present congress will provide an appropriation of $8,000 for the purpose of constructing a telephone line from the mainland to Plum island, Wis., and thence to Washington island. Representative Minor of Wisconsin has introduced a bill with that end in view and the appropriation is recommended by Supt. Kimball of the life saving-service. Plum island is situated in the middle of the water passage between Lake Michigan and Green bay, which separates Washington island from the mainland and which is known as "Death's Door." The passage is much availed of by vessels running between the ports of Lake Michigan and those of Green bay. Supt. Kimball says he has accounts of thirty-one disasters in this neighborhood within the last ten years.

The Richelieu & Ontario Navigation Co. has purchased the steamer Virginia to run in conjunction with the Caroline on the Quebec-Saguenay route. The Virginia is a comparatively new vessel and has been engaged in service between Baltimore and Old Point Comfort.

CIRCUIT COURT DECISION IN COLLISION CASE.

Among several decisions in lake collision cases recently handed down by the United States circuit court at Cincinnati (sixth circuit) is the final finding in the case of the American Steel Barge Co. (now Steel Corporation) against James Davidson resulting from a collision between Davidson's barge Athens and the whaleback barge No. 131 at the Sault in 1897. The owners of the whaleback first libeled the Athens in the district court. Davidson denied the fault imputed to the Athens and filed in the district court a cross-libel charging the whaleback and the steamer in charge of her with the sole responsibility for the collision. In the district court the libel was sustained and the cross-libel dismissed. Davidson appealed to the circuit court but that court also decided against him, sustaining the decree of the district court. The statement of the case and the opinion of the circuit court as delivered by Judge Severns is as follows:

"A tow of vessels belonging to the American Steel Barge Co., consisting of the steamer John B. Trevor, the barge No. 133 and the barge No. 131, were going up the St. Mary's river in the order in which they are here named, without cargo, on a voyage from Cleveland to Duluth. On the morning of July 2, 1897, at about 2:30 o'clock, the tow was approaching the foot of the lock on the American side of the Sault Ste. Marie. Shortly prior to this, a tow of vessels belonging to Davidson, the appellant, consisting of the steamer Rappahannock and the barges Algeria and Athens, had been coming down in that order, from the opposite direction, loaded; and after getting through the lock and straightening up below, was moving down slowly, seeking a place in which to tie up until the weather should clear. A heavy mist or haze was on the surface of the water, though not so dense as to prevent navigation if it was conducted with due caution. But there was a place below, at the turn of the Little rapids, where navigation was more difficult, and hence the precaution of waiting for better light. There was no wind and the night was not dark except for the low-lying mist or haze just mentioned. The vessels of the tows were each about 300 ft. long, the steamers a little longer, and the rear barges were on hawsers about 300 ft. long. Other vessels were in the water, and the docks along down on the American side were pretty fully occupied.

"As the steamers approached each other, they agreed by a signal of one blast to pass to the right. The steamers did so at proper distance from each other. Up to this point the location of the vessels of the two tows appears to have been free from fault. There is nothing in the evidence which induces us to doubt that the tows and all the vessels thereof were at a safe distance from each other and that there was special danger to be apprehended. In respect to what ensued, there is an irreconcilable conflict in the testimony. But fortunately the salient facts are easily enough seen, and we are relieved from the necessity of attempting to harmonize the proof relating to the smaller details.

"The substantial facts are that at about the time the barge No. 131 was passing the Rappahannock the tug L. B. Smith came along the port side of that barge, and lines being fastened to her, brought her forward along the port side of No. 133, preparatory to their being put into the basin of the lock, and was proceeding to push both vessels to the starboard for proper position to enter the lock. The Athens was coming down on a slackening tow line and sheered off toward the tug and the tow it was trying to assist. Seeing the Athens coming, the tug fell back; then No. 131 fell back also until she was behind No. 133, where she was struck a glancing blow on the port bow, by the Athens which had not recovered herself. The stem of No. 131 was carried to starboard by the impact of the Athens and she was again hit amidships by the latter vessel as they passed.

"1. There is no proof which we can think impeaches the movements of the Trevor and the vessels in that tow. The utmost that can be said, is that some of the officers on those vessels did not know some conditions and events that with sharper observation they would have known. But nothing which they failed to observe contributed to the disaster. And it is fair to remember, that almost to the moment when the mischief happened there was nothing to indicate danger or to stimulate unusual observation.

"2. The navigation of the vessels of the libellant being proper, and the irregular and damaging conduct of the Athens being clearly shown, it was incumbent upon her to make such explanation as should free her from liability. (The Wheeler, 24 C. C. A. 353; the Ohio, 33 C. C. A. 667; the Fontana, lately decided by this court.) This she has not done. In her answer and in the cross-libel, it was charged that the speed of the Trevor was too great and that not only that vessel but those in her tow crowded too far over toward the American shore. But neither of these defenses is made out.

"It would not be difficult, if it were open upon the pleadings to do so, to conclude that the shear of the Athens which brought the vessels into collision, was the result of her being left by her steamer without proper steerage way. There is much in the case to produce the impression that the Rappahannock was moving very slowly and that her tow was, in consequence, somewhat collapsed. But the answer of the Athens insists that she maintained a proper position, though her headway was only sufficient for her to swing very slowly,' and her captain testifies that she had sufficient headway. The testimony of the mate points to a different conclusion. The district court held that the Athens was at fault in not porting her helm in obedience to the signals for passing, and also in not employing a tug to assist her in her navigation. If she had sufficient headway, the reasonable conclusion is that her helm was not properly attended to.

"No explanation of her erratic and dangerous course being given by the Athens, sufficient to justify or excuse it, the decree of the district court holding her responsible for damages was right; and it is affirmed."

INSURANCE LOSSES IN WOODEN HULLS.

Buffalo, Feb. 17.—"We have been able to summarize our season's losses far enough now," said a lake insurance agent a day or two ago, "to make sure enough that the wooden hulls we have covered have cost us 125 per cent of the gross premiums, and that the loss is heavy enough to take all the profit out of the steel-hull business."

All of which makes an inference or two further into the case about as good as a certainty. It is not stated just how the steel-hull business stands by itself. It is said that it is not figured out yet as definitely as the wood-hull season has been and there does not appear to be quite the freedom to give information in this line as with the wooden vessels.

Well, it did not need this reminder to assure us that the days of the wooden vessel are over, or, that the steel one is here to stay, not only as a class, but as an individual, for when something gives out it is taken off and either re-made or replaced and the part is new again. There is no "boring" of a steel bottom to see how it has stood the years and there are no flies, that is, barnacles or other accumulations, on the outside of fresh water hulls. If only the owners could be persuaded, or made, to stop loading their vessels so deep that when they pull heavily past the foot of Main street the dock idler could see no scandal of a deck fairly level with the water, there would be more certainty in the earnings of the lake business as a whole. Selling anything to the insurance companies is bad business at the best.

It has fairly come of late to be necessary for the insurance companies to make their money in lake insurance out of the cargo business, so that when that also comes out on the wrong side of the ledger, as it mostly did last season, it is loss to a certainty. The one good point in the lake insurance business appears to be, then, that the steel hulls did make some money and it may be inferred that they will do it again on the average, unless there comes along another period of low water, when the bottom of the interlake passages will make a deeper hole in the profits than they have done of late. There seems to be no prospect of material change in hull rates for the coming season. The underwriters do not command the situation enough to raise them and they are not likely to lower them.

"I believe," said Maj. Symons the other day (whose prospective departure already begins to make him a sort of sacred memory), "that the rail opposition to canal enlargement is about dead. We saw nothing of it in Albany at the late hearing and I am prepared to see the leading roads put lines of boats of their own on the canal and operate them, just as they do on the lakes now."

There are not a few sceptics here yet, as regards the passage of the canal enlargement bill, and they are bound to make us feel uncomfortable till it goes through. "No faith in it," has killed more good people or rendered them useless, than it has measures, but it is a decidedly uncomfortable weapon for all that, it is walking backwards, with your face to the enemy, and trying to set up a reputation for a prophet if the thing goes one way and being in place to fall in face foremost if it goes the other.

It takes a farmer, though, to tell the commercial interests of the country why there is no health in the canal movement. With the railroads fairly swamped by the freight that is pouring in on them, with them more responsible by a long way for the coal shortage this winter than the mines were, with New York and Buffalo eager to set up and pay for an improvement that will double the State farmer's markets for him, he is engaged in maintaining that the whole movement is a political grab, that it is not needed, for the canal is not used up to capacity, and that the National government is the one to look after it anyhow.

I do not believe there is a single interest in Buffalo that is at work for canal enlargement for its own direct benefit. When the people come to vote on it this will hardly be the case, for labor will stand for such an improvement almost to a man, which is one reason why it cannot be beaten at the polls, but let anyone go to a Buffalo canal meeting and point out a man who expects to make money out of the new canal. Unless there is an occasional boatman there, and they are taking no particular part in the movement, the meeting will be found to represent commerce and practically nothing else.

Meanwhile we look for the new canal. There will be some hitches, but the measure has too many friends to fail. There are too many people convinced of its need who used to see the other way for the barge canal to fail now.

JOHN CHAMBERLIN.

LIGHTSHIPS FOR THE DOMINION GOVERNMENT.

The two lightships which the Polson Iron Works, Toronto, is building for the dominion government, form a part of the plans decided upon by the Hon. James Sutherland, during his tenure of office, for the improvements of aids to navigation on the Atlantic coast and on the Gulf of St. Lawrence. The two lightships are fac-similes in every respect and are of the following dimensions: Length. extreme, 123 ft. 6 in.; length between perpendiculars. 112 ft.; breadth, 28 ft. 6 in.; depth, keel to bend. amidships, 14 ft. 10½ in. The construction is to be very heavy and far in excess of Lloyd's requirements. The hulls will be divided by watertight bulkheads into five compartments. They will each have three decks, the main and spar decks being continuous and the lower deck extending from the stem to the coal bunker bulkhead forward and from the sternpost to the engine bulkhead aft. The lower deck will be of steel; the main deck of steel covered with a 3-in. wood deck, and the spar deck of wood. They will each be provided with two hollow steel masts, fitted with standing and running rigging for every kind of service on station, at sea or in harbor. The dynamos and engines for the electric plant will be located on the main deck within the engine casing. They will each be fitted with an inverted surface-condensing, single engine with cylinder 23 in. in diameter by 22 stroke. Steam will be supplied by two cylindrical straight tubular boilers, 9 ft. in diameter by 16 ft. 7½ in. long.

DULUTH-SUPERIOR COMMERCE.

Duluth, Minn., and Superior, Wis., leading ports on Lake Superior, are within a single harbor and for several years past it has been the custom of the engineer officer in charge of harbor works to insist upon his right under the law to have reports from a commerce standpoint from all vessels entering or clearing. Thus at this point we have statistics of commerce that are not to be had from other places around the lakes where the engineers do not demand reports from the vessels. Of course it is understood that reports of lake commerce from customs officials are almost valueless, on account of the inability of the collectors to secure complete reports under the customs regulations as they have existed for a great number of years past.

The latest report of Duluth-Superior commerce is from Capt. D. D. Gaillard, who has been engineer of the Duluth district for a year or more. His summaries, which go into great detail, show that the vessel freight arrived and departed in 1902 amounted to 17,505,793 tons of 2,000 lbs., valued at $194,444,695. The increase in freight tonnage since 1890 is 515 per cent., and the increase during the past year 35 per cent.

"It is impossible," says Capt. Gaillard, "to give precise figures of the marine commerce of the principal ports of the United States for comparison with Duluth-Superior harbor, for the reason that at ocean ports of the United States, as well as of foreign countries, no record of domestic tonnage is kept at the custom house, whereas at Duluth-Superior a record is kept for the total marine commerce both foreign and domestic. In the principal ocean ports of the United States the tonnage of the local and coastwise (domestic) marine commerce is several times greater than that of the foreign. Any comparison, therefore, of the relative marine commerce of Duluth-Superior and ocean ports, based solely upon custom house records, is, for the reason just stated, incorrect and misleading. But from commercial statistics (published in the report of the chief of engineers, United States army, for 1902), furnished by boards of trade and commercial and maritime exchanges to officers of the United States corps of engineers in charge of improvements at the various ocean ports, it would appear that, based upon annual vessel freight arriving and departing, the relative standing of the principal ports of the United States is now as follows:

1.—New York.
2.—Philadelphia.
3.—Duluth-Superior.
4.—Boston.

"The navigation season for Duluth-Superior harbor averages only about eight months per annum, while for the three ocean ports mentioned above navigation is carried on during twelve months. Considering the mean monthly freight movement during the season of navigation, Duluth-Superior harbor stands next to New York."

Capt. Gaillard's tables dealing with the lake commerce of Duluth and Superior cover a great many pages. The main items are as follows:

LAKE COMMERCE, DULUTH-SUPERIOR HARBOR.

Year	Receipts and shipments, Net tons.	Valuation, receipts and shipments.	Number of vessels entd. and departed	Registered tonnage of vessels.	Aver'ge net regd. ton. exclusive of tugs.
1895	6,325,351	$95,000,000	10,986	11,434,272	1,172
1896	7,886,833	111,676,900	10 948	13,353 068	1,351
1897	8.475,224	118.551,185	9,758	12,845,865	1,434
1898	10,127,261	142,643,020	10,870	14 135,237	1,480
1899	11,603 038	157,143,966	11,526	14,433 501	1,435
1900	11,725,245	135,109,196	11,334	14,387,068	1,443
1901	12.973,373	161,305,819	13,264	17,245 719	1,529
1902	17,505,793	194,444,695	15,866	23,811,275	1,667
Total-	86,627,168	1,115,874,781	94 552	121,646,005	.....

The quantity and value of different items of freight entering into this Duluth-Superior commerce during 1902 are shown in the following table:

RECEIPTS AND SHIPMENTS WITH VALUATIONS, DULUTH-SUPERIOR COMMERCE, SEASON OF 1902.

Description of Cargo.	Unit.	Quantity.	Unit price.	Valuation.
Cement	Bbls.	183,460	$2.25	$412,785
Coal, hard	Tons	290,736	6.25	1,817,100
Coal, soft	Tons	2,382,803	4.00	9,531,212
Copper	Tons	35,756	250.00	8,939,000
Fish	Tons	1,419	100.00	141,900
Flax	Bush	12,825,078	1.50	19,237,617
Flour	Bbls.	7,660,326	4.00	30,641,304
General merchandise,	Tons	272,904	150.00	40,935,600
Grains (exclusive of wheat and flax)	Bush.	8,699,245	.50	4,349,623
Hay	Tons	284	12.00	3,406
Iron Ore	Tons	10,884,356	2.25	24,489,801
Limestone	Tons	89,549	1.50	134,324
Logs	M. Ft.	136,599	12.50	1,707,488
Lumber, hardwood	M. Ft.	702	50.00	35,100
Lumber, pine	M. Ft.	416,582	15.25	6,352,876
Machinery	Tons	1 379	330.00	455,070
Manufactured iron	Tons	115,223	65.00	7,489,495
Oils	Bbls.	114,592	7.00	802,144
Poles and piles	Number	119,709	1.65	197,520
Posts	Number	25,622	.12	3,075
Pulpwood	Cords	5,055	5.00	25,275
Salt	Bbls.	367,409	.60	220,445
Sand and gravel	Cu. Yds.	22,110	1.00	22,110
Shingles and lath	M.	343,827	2.75	945,524
Silverand lead ore	Tons	50	78.00	3,900
Staves	Number	463,300	4.75	2,201
Stone, building	Tons	10,518	7.00	73,626
Ties, railroad	Number	190,599	.40	76,240
Wheat	Bush.	41,007,337	.74	30,345,429
Wool	Tons	10, 107	500.00	5,053,500
Total valuation				194,444,695

Note.—All tons are of 2,000 lbs.

CANADIAN MARINE NEWS.

Capt. W. Ross, who for a number of years was in charge of steamers for the Allan line, died at Westmount, Montreal, Feb. 9.

The twin-screw steamer Lady Laurier, the second of the two steamers built in Scotland for the Dominion government, left Paisley for Halifax Feb. 11.

Capt. Alex. McDougall of Selina, N. S., one of the oldest ship builders in the province died there recently, aged 84 years. He built some of the finest ships that ever sailed from Nova Scotia, and for twenty years built all the ships required by the well known firm of Brown & Watson, Glasgow, Scotland.

There is a revival of ship building on the St. John river, the Hillyard yard having a number of orders on hand. The tug Lord Kitchener, for seagoing service, has just been launched, and the keel is being laid for a steamer for the freight and passenger service between St. John, N. B., and Halifax, N. S.

The recent reports that the tug D. P. Ingraham sunk in a gale off the coast of Newfoundland have turned out to be without foundation; the tug weathered the storm safely. The D. P. Ingraham has been in service on the coast since 1873 at which time she was one of the most powerful tugs in the service.

Capt. Bassett, for many years in the service of the Northern Navigation Co., is one of the principal promoters of the Western Steamship Co., which purposes engaging in the freight carrying business between Collingwood and upper lake ports. Another new company—the St. Mary's River Navigation Co.—has been chartered by the Ontario government to carry on a general navigation business on the great lakes. The head offices of the company are at Sault Ste. Marie.

On the smaller inland lakes of Ontario the coming season promises to be a bright one. The fleets of the different companies are being put in order and improved. The Lake of Bays Navigation Co., which was organized last year, earned 9 per cent. on its capital, and is building a new steamer 100 ft. long, 20 ft. beam and 7 ft. depth of hold, to have a speed of fourteen miles an hour and accommodation for 325 passengers, to be ready for the coming season's trade. A new company—the Kawartha Lakes Navigation Co.—has been organized at Lindsay, Ont., to carry on a general navigation business on the Kawartha lakes, a region adjoining Misholea. The Rainy River Navigation Co., which operates on the Lake of the Woods, proposes to build a new steamer to cost $150,000 for its passenger service, to be ready for the season of 1904.

There is a good deal of dissatisfaction in Prince Edward island in regard to the maintenance of steamer communication with New Brunswick and Nova Scotia ports. The permanent winter route is between Georgetown, P. E. I., and Pictou, N. S., the steamer employed being the Minto, but the shorter route is between Summerside, P. E. I., and Cape Tormentine, N. B. The steamer Stanley was put on this service, but on Jan. 12 got caught in an ice pack, and has since been drifting up and down the strait within sight of the shore. For some time also the Minto was unable to leave Pictou by reason of the pack ice outside the harbor, thus cutting off the island entirely, the sole means of communication being by ice boat. The problem of maintaining communication between the island and the main land will only be solved by the employment of a thoroughly equipped ice breaking steamer of the Ermaak design.

MAJ. SYMONS GOES TO THE WHITE HOUSE.

And now Maj. Thomas W. Symons, one of the most competent of the army engineers on the chain of lakes, and probably the greatest living authority on the subject of waterways (real and proposed) from the lakes to the Atlantic seaboard, is to go to the white house to occupy a largely social position in place of Col. Theodore A. Bingham, transferred to Buffalo. Col. Bingham has been since March, 1897, the superintendent of public buildings and grounds and military aide to the president, in which position he has charge of all entertainments at the white house. He has been, in fact, the president's master of ceremonies, and all the household expenses chargeable to the government have been disbursed by him. Things have not been altogether to Col. Bingham's liking since President Roosevelt has occupied the white house. His difficulties began when a civilian architect was employed to enlarge the white house, thereby creating a condition which every army officer and every civilian will thoroughly appreciate. Col. Bingham, with other officials, ridiculed the official structure and it was apparent to the densest intellect that Col. Bingham did not approve of Architect McKim's ideas. Col. Bingham, as disbursing officer, had to officially indorse a great many things which he did not approve of at all and some months ago he requested to be relieved. The president, however, persuaded him to remain. Matters then went on placidly enough to all outward seeming until Col. Bingham presented his estimate to congress of white house expenses for the coming fiscal year. In the past from $25,000 to $30,000 has been sufficient, which includes all cost of living save eatables and drinkables. President Roosevelt has surpassed all other presidents as an entertainer, but it has been a matter of pride with him that he has used his official salary for that purpose. The president was therefore greatly surprised when Col. Bingham asked congress for an appropriation of $60,000 for white house expenses, saying that the big increase was due to the lavish entertaining of the president. Usually this appropriation has been secured by Col. Bingham merely telephoning the amount to Mr. Joe Cannon, the chairman of the appropriations committee; but this amount was so excessive that Cannon asked Col. Bingham to put it in writing. Col. Bingham thereupon wrote the following letter which caused all the mischief: "The former estimate for labor and incidentals connected with the winter entertainments at the white house must have a considerable increase, because the president is doing a large amount of entertaining. Also, owing to the abolition of the conservatory and greenhouse, flowers have from time to time to be purchased for the winter entertainments which cannot now be furnished by propagating gardens."

This letter was especially offensive to President Roosevelt, in that it spread the impression that he was entertaining at the government's expense and it did no good for Col. Bingham to explain that increased entertainments meant increased linen, increased laundry work, and that hardwood floors, instead of carpeted floors, meant a corps of servants to keep them polished.

The post of superintendent of buildings is a desirable one and is much coveted by engineers. Maj. Symons is undoubtedly the personal selection of the president. He is a man of charming personality and has been hitherto associated with the president in public work. President Roosevelt doubtless desires him at the white house; but nevertheless a very thorough and painstaking engineer is removed from important construction work where he properly belongs.

DEATH OF WILEY M. EGAN.

Wiley M. Egan, one of the most widely known shippers and vessel owners and quite prominently identified with Chicago commercial life, died last Thursday at his home in Chicago. Mr. Egan had been a resident of Chicago since 1835 and achieved great success as a business man. He was president of the board of trade in 1867 and 1863. During that time he took an active interest in politics and was elected to the legislature in 1871. He was born at Ballston, N. Y., Aug. 1, 1827, and was married to Miss Mary P. Helm, Nov. 28, 1848. Shortly after reaching Chicago he became a sailor and sailed before the mast from 1842 to 1853. Gradually he advanced until he became master of a vessel and later the owner of several. Among the vessels which he owned were the William Egan, Plankinton, Armour and Fitzgerald. In 1857 he went into the business of commercial insurance in addition to his marine business. He is survived by a widow and three children.

Wiley M. Egan.

Joseph Croze, ship builder of Houghton, Mich., has been unusually busy since the close of navigation. He recently made repairs on the tug J. C. Morse that necessitated hauling her out. She was relaunched in good condition. He is now engaged in making repairs on the tug Grayling.

AROUND THE GREAT LAKES.

An act has just passed congress to authorize the construction of a life-saving station at Lorain, O.

Capt. H. W. Hart, senior member and manager of the Hart Steamboat Line, Green bay, died last week of heart disease. He was fifty-seven years old.

Capt. A. W. Stalker of Toledo will sail the steel steamer W. W. Brown this season. Last year he was master of one of the steamers of the Bradley fleet.

A dividend of 1 per cent. has been declared on the common stock of the American Ship Building Co., payable Mar. 2 to common stockholders of record at the close of business Feb. 18.

It is understood that Canadian vessels of the lakes are to be included this year in the Inland Lloyd's register. Inspectors are now engaged in going over both Canadian and United States vessels.

Capt. H. J. Slyfield, for several years in command of the Detroit & Cleveland steamer City of Mackinac, died from pneumonia at Detroit last week. He was one of the most trusted men in the employ of the company.

The fueling scow Black Diamond is to removed from Cleveland to Ashtabula in the service of the Pittsburg Coal Co., taking the place of the Youghiogheny which is to undergo alteration and then be put into service at Erie.

A dispatch from Milwaukee announces that the steamer Minnie E. Kelton and Marion have been sold by Sidney O. Neff to the salt trust. They have been engaged in the salt trade for some time under charter from the Neffs. The steamer John Duncan has been sold to the Neffs by the Duncan estate.

The Lake Erie Supply Co. of Conneaut, in which the Messrs. Hausher of Cleveland were interested, has sold its business to the Pittsburg Steamship Co. This means that the Steel Corporation officials intend to furnish supplies direct to their vessels at Conneaut, and probably later on at other places, in addition to the general supply service at the Sault.

President William Livingstone, Counsel Harvey D. Goulder and Treasurer George P. McKay of the Lake Carriers' Association left for Washington this week to secure, if possible, government maintenance of lights in the lower Detroit river and on the Southeast shoal, Point au Pelee passage, Lake Erie, which are at present maintained out of the funds of the Lake Carriers' Association.

The Reids, father and sons, well known as wreckers, and who have of late made their headquarters at Sarnia have organized a Michigan corporation that is to have offices at Port Huron. They have capitalized their company at $50,000. The stockholders are James Reid, father, and William Reid and J. T. Reid, sons. They propose to conduct a general wrecking business as the Reid Wrecking Co.

One of the busiest of the marine shops at the head of the lakes is the Northwestern Machine & Boiler Works at West Superior, of which W. Callison is manager. Some fifty or more men from these works are now engaged in vessel repairs. The Northwestern works was started in 1890. Charles A. Tepoorten is secretary, J. A. Tepoorten, treasurer, and E. Callison general superintendent of the boiler works.

Capt. B. B. Inman, one of the best known men connected with the lake trade, died in Milwaukee Monday night of pneumonia. He had been ill but a very short time. Capt. Inman, who was fifty-four years of age, was assistant superintendent of the Pittsburg Steamship Co. and was at one time one of the largest tug owners on the lakes. He operated a fleet of tugs at Duluth for fifteen years. He started with the tug J. L. Williams and a half dozen years ago he had a fleet of fourteen tugs doing harbor work at Duluth.

The annual meeting of the Great Lakes Towing Co. was held at Jersey City this week. The following directors were elected: Col. George A. Garretson, W. G. Mather, L. C. Hanna, H. G. Dalton. R. R. Rhodes, C. E. Grover, T. F. Newman of Cleveland; L. M. Bowers of Binghamton, N. Y.; C. W. Elphicke, Capt. Dennis Sullivan of Chicago; James Ash, Edward Smith of Buffalo; Capt. James Davidson of Bay City, A. B. Wolvin of Duluth and W. T. Colman Carpenter of Jersey City. The directors will meet in Cleveland next month to elect officers.

Mr. Frank W. Gilchrist of Alpena, Mich., has been successful in his efforts, as far as the house of representatives is concerned, in securing American registry for the steamship Mira, which was wrecked off the coast of Cape Breton. The release of this steamer from the rocks has already been described in the Review. The cost of the operation was over $50,000. She is now at Cramps, Philadelphia, being rebuilt at a cost approximating $100,000. Under the navigation laws of the United States a foreign vessel cannot be admitted to American registry unless the cost of her rebuilding comes within a specified percentage of her value or unless equivalent tonnage is built in the United States. The Mira, formerly the Beaumont, is British-built. The coast ship owners fought her admission to American registry but the lake representatives were unanimous for it and succeeded in carrying the bill by a vote of 143 to 24.

TRANSATLANTIC SHIPPING BUSINESS.

Discussion Regarding Effect of the Morgan Combine and Cunard Agreement with the British Government—Criticism of the Cunard Agreement.

[By an Occasional Correspondent.]

Agreements which the government of Great Britain has entered into with the Cunard company and the Atlantic shipping combination have been fully set forth in the columns of the Review, together with a general resume of the comment heard in British shipping circles since the agreements were effected. It would seem, however, that there is still much of interest to be said regarding the effect of the Morgan combination and the Cunard agreement on transatlantic shipping business. Briefly the Cunard company is to receive a loan of a sum of money sufficient to enable it to build the two large and very fast steamers for which contracts have just been let. The amount is not definitely fixed, but it will probably be about £1,500,000, upon which interest at the rate of 2¾ per cent. per annum is to be paid, and the principal is to be refunded in instalments extending over twenty years. The company is also to receive an annual payment of $750,000 until the expiration of the agreement in 1922. In consideration of these benefits the Cunard company undertakes "until the expiring of the agreement to remain a purely British undertaking, and that under no circumstances shall the management of the company be in the hands of or the shares or the vessels of the company be held by other than British subjects." The usual undertaking to hold at the disposal of the government the whole of its fleet, as well as the right to charter or purchase all or any of the vessels at agreed rates is, of course, given, and there is an engagement not to "unduly raise freights or to give preferential rates to foreigners."

This agreement differs from the various arrangements made by Great Britain with the steamship companies since about the year 1850, and on that account a detailed criticism of it appears desirable. For the past forty years all mail contracts have been open to public competition, and each contract has been given to the lowest bidder. Since 1891, payments have been made to certain steamship companies to enable the admiralty to take their vessels in time of war. The total sum paid under this heading has not exceeded some £50,000 per annum. The amount paid for carrying mails to all parts of the world being about £700,000, it will be seen that the Cunard company will soon have at its disposal about one-sixth of the yearly payment made by Great Britain to all steamship owners for all purposes. The government may tell the numerous English shipping magnates that the Cunard subsidy is not to be made a precedent, and is to be regarded as an exceptional case, but this is not likely to be considered a satisfactory statement. Even if it is said that the Cunard concern had to be saved from the Morgan combine at any cost, the ship owners left out in the cold might reply that Mr. Morgan is not the only foreigner who has been buying up steam lines in order to capture the British trade they command. The Germans have been doing the same thing all over the world. Little has been said concerning their purchases in the newspapers, but they have nevertheless acquired British lines of ships trading with Mexico, Jamaica, Singapore, and elsewhere. Every point of advantage which any German wrests from England either on sea or land at once becomes a center of anti-British activity.

The argument was used in the London journals that if Mr. Morgan had been allowed to carry out his plans American competition would have become so irresistible that the British commercial flag would have been swept off the Atlantic. This idea is hardly worthy of a serious answer, and it is rebutted by the fact that out of 411 ships which entered the port of New York last October, 189 carried the British flag, and eighty-one the American. But if it had been true that the combine was going to capture the Atlantic trade, an annuity of $750,000 a year paid to a single competing company could not have gone far towards preventing it. It is only one-half of the annual guarantee which the combine has given to the German steam lines, which have the "working agreement" with the International Mercantile Marine Co. The British government is now in somewhat of a dilemma, although nothing appears to have been written upon the subject. One of two events must happen in the transatlantic trade—either the Morgan competition will prove formidable in spite of the Cunard subsidy, or it will turn out a false alarm. In the former event, it may extend to other parts of the world where defensive measures of an equally heroic kind may have to be taken against it. In the other event, the British taxpayer will have almost thrown away $750,000 a year for twenty years. And in the meantime most of the British ship owners will regard the Cunard agreement as giving them a right to appeal to the national treasury whenever they are threatened with any new form of foreign competition.

Even admitting that the English government was obliged to do something in the emergency, and also admitting that the Cunard agreement may perhaps be the best that could have been made in the circumstances. no business man can possibly accept it as anything more than a makeshift. The suggestion of its being a permanent development of the maritime policy of the British nation is unworthy of consideration, because it deals with one special case only, and because it is merely provisional in its character. There will, no doubt, be some permanent development in the shipping policy of Great Britain in order to meet the new exigencies which have arisen and are still arising. This point should be kept in mind by ship owners on this side of the Atlantic. John Bull may have been asleep, but he is waking up very rapidly. While the total exports from the United States for eleven months of 1902 showed a decrease of $150,000,000 as compared with the same period of 1901, those of Great Britain show an increase, small, it is true, of about $15,000,000.

The best use that can be made of the Cunard agreement for American purposes is to treat it as an experiment—as a standard by which to judge kindred measures of the future. A practical question to ask is: "Can this agreement serve as a model for the United States government in its contracts with ocean mail steamship companies?" The answer must be an emphatic "no." It is not even a model for the United Kingdom to follow. British shipping contracts were complicated in the past. The Cunard contract makes them still more complex, for it brings into them another government department—the board of trade. Originally the steamship companies had to deal with the post office alone. Next they were invited by the admiralty to enrol themselves as a naval reserve with special retainers. Then the colonial office came in with a special postal service for certain colonies. And now the board of trade puts in an appearance to counteract the Morgan combine. It is safe to say that the government of the United States will not muddle its shipping subsidies by involving four separate departments of the administration. The Germans have done much better. They have not spread anything over four departments that could be done by one. Thanks to the late Prince Bismarck, who negotiated the original contracts with the North German Lloyd company, the arrangements between the German government and the shipping companies are models of comprehensiveness and exactness. There is no desire in England, however, to copy anything German, although the advantages of so doing are in some cases quite evident.

Under the new arrangement the Cunard company will receive from the British government nearly as much per annum as the North German Lloyd receives from the German government. The mail steamers of the latter corporation, it must be remembered, go to almost all parts of the world. For a yearly payment of a little less than $1,500,000 the North German Lloyd has to give a much greater aggregate of public service than will be obtained by the British post office, admiralty, colonial office and board of trade. The general belief that the English company surrenders its former contracts upon acceptance of the new agreement is an error, the truth being that the latter does not affect its existing arrangements with departments of the government other than the board of trade. The German corporations in the shipping business are required to submit to obligations which are far more rigorous than any that have been suggested either here or in England. The mail contracts stipulate not only for a minimum speed but for a minimum size of vessel, a proviso which has been very successful in operation. It has helped to secure for the German mail steamers an important part of the passenger business to China and Australasia. The ships must be built in German yards, as far as possible with German materials. The plans must be according to the requirements of the German admiralty. In case of mobilization the mail steamers may be bought or requisitioned by the government. Their sale or hire to foreign countries is not allowed without permission. Even this is not all. No disposition whatever can be made of them without government authority. The rates for both passengers and freight must be authorized by the superintendent of mercantile marine, and they must not be higher from the German ports, Hamburg and Bremen, than from other ports of call. The imperial chancellor may forbid the steamship companies to import into Germany any agricultural products which would compete with German producers. Rebates of 20 per cent. on the conveyance of arms, ammunition and stores for the government are provided for, as are reduced passenger rates for all German officials. Every employe of the steamship corporations must, as far as possible, be German. This regulation includes agents in foreign countries. All adult deck hands and members of the engine-room staff engaged in Germany must consist of men belonging to the naval reserve or of persons under written contract to serve in the navy if steamers are requisitioned, hired or bought by the government. This last condition is so strictly enforced that the companies are obliged to submit the list of every ship's crew to the superintendent of marine.

Any nation is fortunate which can induce steamship owners to agree to contracts like the one described, which make the North German Lloyd and Hamburg-American fleets portions of the German navy. The government has a large number of auxiliary cruisers as completely under its control as if they were actually a part of the navy. They are bound to it as tightly as ironclad contracts can bind them, a fact which Mr. Morgan's firm discovered very quickly when it contemplated including certain lines in the so-called trust. In time of peace important services have to be rendered to the German government. For

example, in conjunction with the national railroads through rates must be given on German produce to all markets reached by the subsidized steamers.

Whenever the time comes for the subsidization of American steamships, the contracts of the German government with its two great ocean carrying corporations ought to be carefully studied by practical business men.

Compared with the above list of specific stipulations the contract made by Great Britain with the Cunard line is a very poor affair. It imposes on the company three obligations, all very general in character. The government is to have the right to charter or purchase all or any of the Cunard ships at agreed prices, but as yet no indication has been given of the process by which the agreement is to be arrived at. The company is to remain "purely British" in ownership and management, but if any guarantee of its doing so is contained in the contract, the fact has not been mentioned in the debates in the house of commons. The company might easily remain "purely British" although all its bonds and stock were in the hands of a "holding corporation" owned by foreigners, although registered in England as a joint stock company. The Cunard must not "unduly raise freights or give preferential rates to foreigners." As yet, however, neither the British legislature nor the taxpayers have been informed as to what would constitute "undue raising." In addition, they are still in the dark as to who is to be the judge of preferential rates." It is not unfair to say that the portions of the contract which have reached the press are sufficiently vague to call to mind certain well known wills made by the testators without legal assistance.

The Morgan combine could not capture the North German Lloyd as it did the White Star line, because such a contingency had been fully provided against in the company's mail contract. Had the English mail contracts been of the same business-like character as those made by the Germans both the White Star and the Cunard lines would have been safe from purchase by non-Britishers. The lesson taught years ago by the sale of the Inman Line to the International Navigation Co. was not taken to heart by John Bull, whose only consolation is that since its Americanization it has never paid a dividend on its stock. The British government had not thought it necessary to stipulate for the permanent nationality of its ocean mail contractors, consequently when a foreign buyer appeared in the market it had no hold on them. The best transatlantic lines were, in reality, sold to Mr. Morgan, with one exception. This exception, the Cunard, remained British on the understanding that it, among other privileges, received an annuity of $750,000 for twenty years.

The Morgan combine found it necessary to purchase an alliance with the German lines and to pay a handsome price for it—a guarantee of 6 per cent. per annum on their paid-up capital. In addition it had virtually to submit to all the commercial conditions of their contracts with the government, such as uniform rates, which in operation will mean that the rates of the combine as well as those of the German lines must be approved by the German government.

The agreement which the combine succeeded in making with the British government is very different. The general effect of it, according to the president of the department known as the board of trade, is to secure that the British companies in the Atlantic combine "shall remain British not merely in name but in reality." The majority of their directors are to be British subjects, their ships are to fly the British flag, to be officered by British officers and to be manned in reasonable proportions by British crews. They are to be as British as the Cunard fleet itself, and it seems a little unreasonable that the Cunard company should be paid $750,000 a year for what the combine gives for nothing. It is true, of course, that the British government agrees to place the British companies in the combine on a footing of equality with other British shipping companies. This may mean a great deal or it may mean nothing at all. The proof will be in the application. In matters of detail the probability is that all the companies will do very much as they like, for nothing is more certain than that the aristocrats who are at the head of the present English administration are no match in shrewdness for any business men. The members of the Morgan firm ought to be thankful that they have not always to deal with methodical people like the Germans, who know exactly what they want and insist upon having everything written in accurate language.

The ultimate result of all the negotiations of the past year is that the German and British mail service with the United States is now subject to three separate agreements—a German-American agreement, under which the combine guarantees $1,500,000 a year to the German companies; a British-American agreement, under which the British government agrees to give the combine equality of treatment with its own citizens; and the Cunard agreement, under which the British government is to pay that company $750,000 a year not to join the combine. Why the combine should be required to pay the Germans for what it gets from the British as a gift; why the Cunard line should be well paid for what the White Star agrees to do without payment; and why the British taxpayers should be required to pay for services which the German taxpayers get as a part of their mail subsidy are matters beyond the comprehension of any investigator on this side of the Atlantic. The whole matter is settled for the present, and all the ordinary observer can do is to wait and see how the three incongrous agreements will work. A slight indication has already been given that the public will not at present benefit by any of them. Last October both the Morgan and Cunard companies—perhaps some others as well— raised the second-class passenger rates from New York to Europe. This is good evidence that the "community of interests" plan is not being neglected. According to both Mr. Morgan and Mr. Ismay of the White Star line, the future policy of the combine is "to do away with unremunerative competition," which means that rates are to be raised. The British government may have supposed that its annuity to the Cunard company would prevent this, but it did not take many weeks to demonstrate the error of that idea. The answer would, no doubt, be that the English contract does not specifically prohibit any reasonable increase.

Although there is harmony at present, it would be rash to prophesy that it will last for an indefinite period. Circumstances and economic conditions are sometimes too strong for even the greatest financiers. If there are more ships in the combine than freight can be found for, the rate from both American and British ports will go down—or some of the vessels will be idle. The Atlantic shipping business has been very dull during the past year. It is now meeting with the worst winter season that it has had for a number of years. Both freight and passenger business are poor, and as usual the poorer it is the greater will be the competition for it. Tramp steamers are numerous; they are not controlled by any "community of interests," and as their expenses are less than those of the regular liners, they can carry freight at a lower price. This condition of affairs may account for the conciliatory tone which the combine has assumed towards its rivals. The results of last summer's business were disappointing to all transatlantic companies, especially to those which use New York as their port. The first act of the combine at that city was to raise saloon rates to Europe about 25 per cent. in honor of the king of England's coronation. A rush for accommodation was expected, but instead of a great increase in numbers during the tourist season there was a very decided decrease as compared with 1901 or 1900. There is little doubt that a further increase in first-class fares had been planned, but after the above-named experience this was not carried out. Finding that the second-cabin was getting more than its usual share of patronage, the price of this part of the ship was increased $5 per head. There is a probability that next summer many passengers for Europe will go to Boston, Philadelphia, Baltimore and the Canadian ports. As soon as the Canadian Pacific service is started, New York will have one more rival. The traveling public are learning that the fastest steamers are the most expensive without being the most comfortable.

It is in the freight business, however, that the friendly rivals will find it difficult to avoid competition. The export boom from this country caused by several splendid harvests in succession culminated in 1901. In 1902 the crops were not exceptionally good. Europe had a smaller deficit than usual to make up with foreign wheat. During the eleven months ended in November last only only 9,844,167 bu. of corn were exported, as compared with 100,254,471 bu. in the corresponding period of 1901. Such a reduction of exports as this means a heavy loss of freight to Atlantic steamers.

The friends of the combine tell us that it will always have a great advantage over its competitors through its connection with the great railroads. They figure out the thousands of miles of railroad which Mr. Morgan controls, and they add that the eastbound freight will all be given to the combine. But this control is chiefly connected with New York. It does not extend to New Orleans nor to Galveston, nor to the Canadian ports. The freight war of the future is to be a war not only of railroads and steamers but of ports. New routes are being opened up in the southwest in order to divert western and Pacific coast traffic from eastern ports altogether. These are changes which no financier, however powerful, nor any combine can control. Mr. Morgan may be omnipotent in New York, but if trans-Mississippi freight should seek other outlets, as it is doing, his steamers will suffer to some extent. The story that the International Mercantile Marine Co. is in a position to keep freight intended for non-combine steamers off the docks at all ports of the United States as a result of these docks being owned by railroads under Morgan control is not believed by anybody who has investigated the situation. The Cunard company at Boston is getting its share of freight at this moment. Moreover, the senders and consignees have the right to say what route their goods shall take. It is only unconsigned freight that a railroad can route as it likes. If British vessel owners send their agents to the west, where a great deal of freight originates, and canvass for it with American energy, they will get all they are justly entitled to. It is simply a matter of "hustling."

Fortunately for British ship owners, the battle has not to be fought out all on one line. There are quite a number of distinct lines—fast passenger service, cheap passenger service,

combined passenger and freight service, and heavy freight service. As regards the first, New York will have an easy lead. It is the natural port for "ocean greyhounds," and no other port would find it profitable to make a high bid for this part of the Atlantic trade. It would be the height of folly for England or Canada to subsidize an ocean service from Halifax for the special convenience of the few rich people who want to cross the Atlantic in five days. The real problem for Great Britain to solve is how to maintain her commercial prestige on the Atlantic against all rivals, American and German. Before that problem can be solved it is necessary to ascertain where the most dangerous attack will be made. It will not be in the "greyhounds," nor in the ordinary passenger service so much as in the freight service. What is to be feared, from the English point of view, is the new type of combined freight and passenger steamer, such as the Celtic, which makes about fifteen knots an hour on a very moderate consumption of coal. The Atlantic liner of the future will carry 20,000 tons of freight and several hundred saloon passengers at about $60 per head, and the combine evidently intends to build ships of this class as quickly as Harland & Wolff of Belfast can turn them out. To compete with the combine it will be necessary to have similar steamers. Three separate services are essential—ship building, ship owning, and freight collecting. Of the three, the last may present considerable difficulty to the Cunard and other British lines. But the Pennsylvania railroad has already had a little disagreement with Mr. Gould over his attempt to create a new route to the Atlantic seaboard, and in the event of a decided quarrel the co-operation of an independent steamship line on the Atlantic might be welcome to an anti-Morgan railroad.

American shipping companies would do well to realize that their British rivals, such as Elder, Dempster and Allan & Co. are not entirely dependent upon the contingencies of American railroad management. The British ship owner has a stronghold of his own which before the end of the century will counteract Mr. Morgan's supremacy in New York and Philadelphia. For a considerable part of the American northwest the natural eastward outlet is through Canada, and as the Canadian railroads show a greater percentage of increase in traffic this year than the American, it seems certain that United States exports are finding their way through Canada in increasing quantities. The Grand Trunk and the Canadian Pacific railroads can move freight with all reasonable speed and they have equal facilities for billing through to Europe. Their ports are not equal to New York by any means, but they are less expensive. Anybody who has looked into the transatlantic shipping prospects will admit that in the future there will be a serious diversion of American exports to Canadian ports.

Returning once more to the Cunard contract, the most lenient criticism must be that it is a practical confession of absence of business capacity on the part of the British government. As has already been pointed out, the necessity for it would never have arisen if British mail and steamship contracts had been so managed as to give the government a proper hold over the steamship companies. Even now that has not been done, and nobody knows when it will be done. The Cunard contract is a curious mixture of old and new ideas. The subsidy of £150,000 a year is a return to the policy of protecting British shipping. The loan for building two new fast ships is an innovation. It establishes a novel relationship between the government and the steamship companies. It places the king of England in the position of a lien holder over a commercial undertaking. As security for the advances to be made toward the building of the two new ships, not only the ships themselves but the whole of the fleet and the general assets of the corporation are pledged. The government will have a substantial interest in the business. If the cost of the two new "greyhounds" is placed at £1,500,000 it will almost equal the existing paid-up capital of the company, which is £1,600,000. That will give the British government (nominally the king) a half interest in the enlarged fleet. Events are conceivable in which additional advances might have to be made and the government interest in the company would be increased. But, as things now are, the British taxpayer is not represented on the board of directors, although a single appointment would have strengthened popular confidence in the arrangement. The gentlemen who compose the king's cabinet seem to have forgotten to ask for such an appointment. Should Uncle Sam become a partner in a steamship business, he may be safely trusted to avoid a similar error. The Cunard contract commits the British Empire to the principle of state ownership of commercial shipping. The great republic should hesitate to follow this example. It is true, of course, that the step taken by England is a very small one, and one that can be easily explained away officially. There is in it, however, the germ of economic revolution. Carried to its logical conclusion the Cunard agreement would mean state ownership and operation of ocean mail steamers. Circumstances may render this advisable for the protection of British national interests, but it is to be hoped that when the subsidy bill comes before congress this idea will not be brought forward, because there is nothing in its favor from an American point of view.

The British government is the largest ship owner in the world. Its ships are intended for war, but they have to be employed in time of peace and they perform some commercial duties every day. The sea-work of the navy and the mercantile marine is similar. The British navy supplies the mercantile navy with many officers and sailors. The mercantile marine is at present under engagements of various kinds to the navy, such as providing armed cruisers in time of war, a plan which is unsatisfactory because it takes the ships away from their regular business and interferes with the rapid conveyance of mails. There is no special reason why a monarchy should not own and operate commercial ships. Germany owns and manages railroads, a more difficult class of property to administer than ocean steamers. The government of India finances and operates railroads on a very large scale—how successfully the writer does not know. The nationalizing idea is quite liable to "take root" in England at any time, and American ship owners should remember that if the Morgan combine injures British shipping to any appreciable extent, the government may be expected to enter the ocean mail-carrying business. By the making of the Cunard contract England's traditional free trade policy has been thrown overboard, as far as the mercantile marine is concerned, and in its place may be found the complete recognition and acceptance of special relations between the government of Great Britain and the shipping companies.

MARCONI COMPANY INCORPORATED IN CANADA.

The Marconi Wireless Telegraph Co. of Toronto, Ltd., has been incorporated under the Ontario companies act with a capital of $5,000,000 to acquire the patent rights in the Marconi system of wireless telegraphy and any future inventions along the same lines and to invest in the stocks and bonds of any similar corporation. The incorporators are William Barwick, H. C. Osborne, J. Payne of Toronto; J. N. Greenshields of Montreal, and W. R. Green of New York. This company apparently does not propose to be an operating company, and J. N. Greenshields states that the charter was first obtained in Ontario because the procedure there was more expeditious. Notices have been issued that application will be made next session of the Dominion parliament for an act incorporating the Marconi Wireless Telegraph Co. of Canada to carry on a business of telegraphic communication by means of wireless or other system of telegraphy in Canada and between Canada and other countries. The organization of the company has been completed as follows: President, Col. F. C. Henshaw; vice-president, G. Marconi; secretary, B. Shepard; directors, A. A. Allan, W. R. Green of New York, and J. D. Oppe, representing the English Marconi Co. J. D. Oppe will be general manager, with headquarters in Montreal. The company acquires all the rights for Canada and Newfoundland, including the station at Glace bay and the benefit of the contract entered into with the Canadian government. The company has engineers in the field locating sites for stations, and it is expected that stations will be located at Mount Royal, Montreal and at Stony Mountain, Man. Negotiations are pending with the Canadian government for an annual subsidy for the maintenance of a patrol system on the St. Lawrence river and gulf and the Straits of Belle Isle. A factory for the manufacture of the apparatus will probably be established at either Montreal or Toronto.

The installation of the wireless telegraph station at Glace Bay, N. S., has been completed and communication has been inaugurated with the British station at Poldhu, Cornwall, Eng.

YELLOW SAILS FOR SHAMROCK.

Editor Marine Review:—Those who regard snow-white sails as an adjunct to the beauty of a yacht will, no doubt, regret the decision of the Shamrock's owners to furnish their boat with yellow sails. Mr. Lipton has given orders for a speedy boat—graceful, pretty, etc., if possible, but—speedy. An old sailor once said that everything on board one of these racing machines was light except the ballast, and Mr. Lipton has now even reduced the weight of his boat's sails from 10-oz. to 4-oz. duck. For the benefit of the uninitiated I may explain that 4-oz. duck refers to the weight of a square yard of canvas.

While a great many yachtsmen are likely to disagree with me, and to declare that my argument does not hold water, I must give it as my opinion that the Shamrock's new sails will not hold wind. A mixture of two-thirds oil and one-third Stockholm tar applied to canvas gives it a yellow tint and is claimed to preserve sails, and also to enable them "to hold" the wind. Last summer I watched a race between two Portuguese lobstermen, and with the exception of the sail of one of the contestants being old and thin their dories were well matched, and I then observed that he of the light-weight canvas continuously threw water into his sail. Mr. Lipton, expecting the Shamrock and the next Defender to be well matched, and not willing to be seen turning the hose upon his sails, is to have them treated as above stated—the best thing to be done under the circumstances. Better still for the Englishman's chance of success would be a complete suit of sails of 10-oz. duck, for his present canvas will surely show a yellow streak, and not hold the wind. F. H.

New York, Feb. 17, 1903.

MICA METALLIC PACKING.

"A perfect packing" is the claim of the American Metallic Packing Co. for their Mica metallic packing, which they are about to introduce to the marine trade of the country on account of its special advantages in marine practice. The packing is not new, but the company has just changed its headquarters to Cleveland, Williamson building, and will have its principal factory in Cleveland, with Mr. L. B. Kennedy as general manager. The packing has been in use at the works of Jones & Laughlins, at Carnegie plants and in similar well-known establishments. It is broadly claimed that this packing will work perfectly in any place where any soft packing will work, that its life is ten times as great and that it never gets hard and cuts the rod. It is in service on high-speed engines, on high-pressure engines, on the main pistons of locomotives, on Westinghouse air pumps, on water pumps, air compressors, ammonia machines, steam hammers, etc. Among advantages credited to it are the following: That it is not dependent upon a supply of oil, as it will work equally as well without as with lubrication; does not depend for efficiency on the exact fit of the packing to the rod, as it is pliable and fits the rod by compression of the gland; never has to be removed when worn—simply add another ring; that it will make a tight joint on a worn or fluted rod, as it will adjust itself to fill all openings by compression of the gland; none of the annoyance of chipping out hard packing, as Mica never gets hard and can, if necessary, be blown out at any time. In a letter dated Jan. 28, 1903, the proprietor of the Hotel Schenley, Pittsburg, says:

"Enclosed find our order for thirty-five sets of your pliable metallic packing, same as last furnished for our elevator pumps, in October, which we are pleased to report has been working very satisfactorily, both on the water and steam ends; in fact, much better than we expected, as the water ends were badly scored when your packing was applied, but at present they are almost as smooth as new rods. We are confident, that by its use, we effect a large saving."

TRADE NOTES.

The Pearson Boat Construction Co. of Duluth, Minn., makers of yachts, launches, row boats and canoes, has issued a little business card printed in red upon birch bark. It is very appropriate.

The J. W. Butler Paper Co. of Chicago has issued a calendar, somewhat later than most calendars are issued for the purpose of securing individual attention. It would, however, secure attention at any time. It is a very good bit of clay modeling and is thoroughly American in spirit, its figures being those of Kiowa Indians.

The Dodge Coal Storage Co. of Philadelphia is building a large coal handling crane to be installed at the Maryland Steel Co.'s plant, Sparrow's Point. This crane will be driven by electric motors, and the Dodge company has recently purchased for this purpose one 50-H. P. and two 30-H. P. direct-current motors with controllers from the Westinghouse Electric & Mfg. Co.

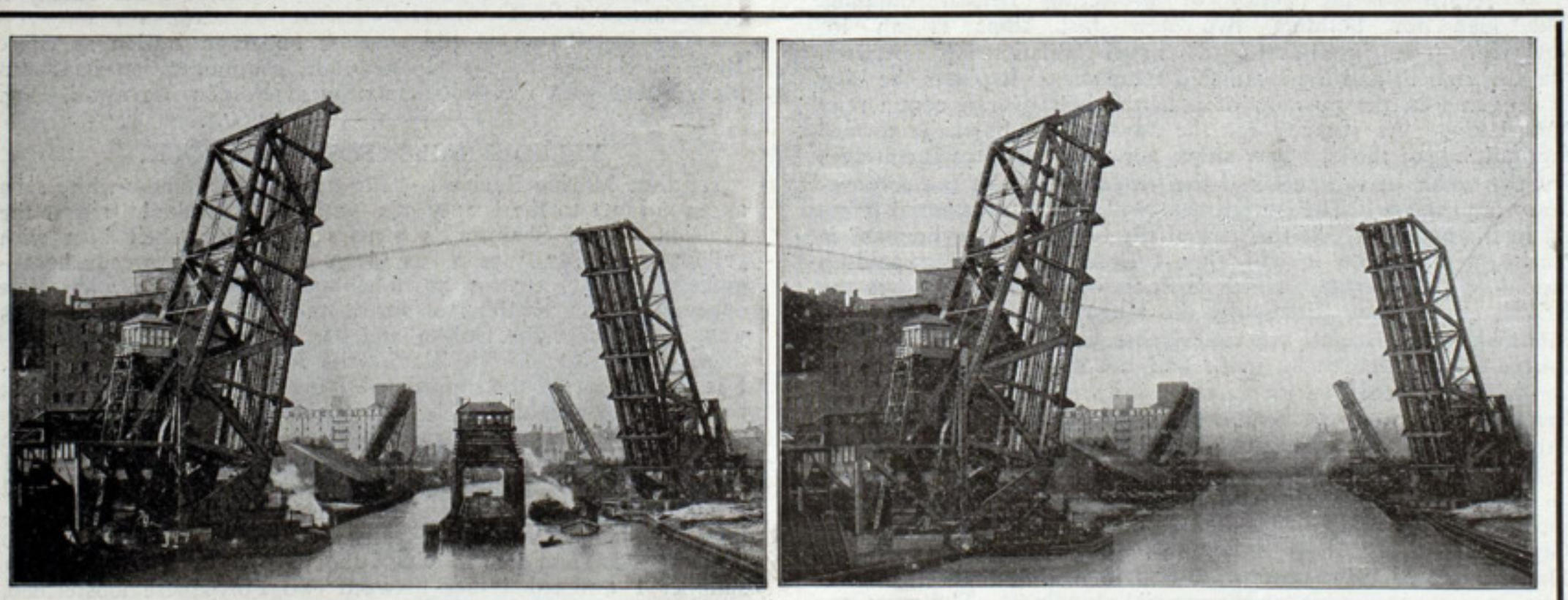
The Kelley-How Hardware Co. and the Thomson-Glaskin Co. of Duluth were concerns well known in the hardware trade of the northwest. Since consolidation some time ago, their business has been steadily enlarging. The new title is the Kelley-How-Thomson Co. Their line of goods includes shelf hardware, iron, steel, mining, vessel, railroad and lumbermen's supplies, and rubber goods.

The Strothman Iron Co., West Superior, Wis., has issued a little catalogue devoted to the Strothman propeller wheel. This wheel is so constructed that instead of throwing the water off at an angle with the line of the shaft it more nearly diverts the line of force in a parallel with that of the shaft. Every pound of water that leaves the wheel flows directly back from the boat, thus obtaining the largest percentage of force. The wheel is built both for speed and towing and is guaranteed by the company to do better than the best. The catalogue is filled with excellent testimonials from vessel men. It can be had for the asking.

If half of what the H. W. Johns-Manville Co. of New York say of Salamanderite in their little yellow catalogue is true—and, of course, it is all true—Salamanderite must be a very wonderful material. It is one of the latest of the asbestos discoveries. By its use any decorative effect obtainable by the finest cabinet work in the costliest woods, or by tiling, can be duplicated at a small percentage of the cost of the original. It is finished on one side in exact fac-simile of quartered oak, mahogany, maple or any fancy cabinet woods, plain or in the finest marquetry or bas-relief effects, indistinguishable from the most costly work, with none of its disadvantages. Of course for churches, theaters, steamships, residences or any structure its value is obvious. The catalogue will be sent to anyone interested.

The Locomotive & Machine Tool Co. of Montreal, Can., lately solicited proposals for $300,000 worth of machinery. John Bertram & Sons Co., Ltd., Dundas, Ont., got the best of it, for they secured an order for $150,000 worth of machinery while the Niles-Bement-Pond Co. secured orders amounting to about $130,000, including cranes. An agent of an American firm who was present wrote home to his office saying: "There was lots of fun before the awards were finally made, from the fact that the company had issued a circular letter to all the machine tool builders and brokers in the United States, and everybody was there, from the fellow who carries a hatful of set-screws up to the representative of the Niles-Bement-Pond combination. Considering what they were up against those Bertram people ought to shake hands with themselves for the way they came out of the fight, for they got the biggest bunch of tools in number and in dollars and cents of any one concern; in fact, they got everything they bid on, and had not the time limit been so short for delivery they would have set a pace for their American friends that would have made their heads swim. That Bertram man—his name is Reid—was a gem and made some of us American guys look like thirty cents. He left the town with many of our scalps dangling in his belt but we could not help taking off our hats to him, for the clever, but withal fair, way he did it."

The loading committee of the Lumber Carriers' Association and the delegates from the Longshoremen's Association of Lakes Michigan and Huron will meet at Manistee on Feb. 23 to arrange the wage schedule for loading lumber on vessels at the various ports for 1903.



TWO VIEWS OF

THE SCHERZER ROLLING LIFT BRIDGE

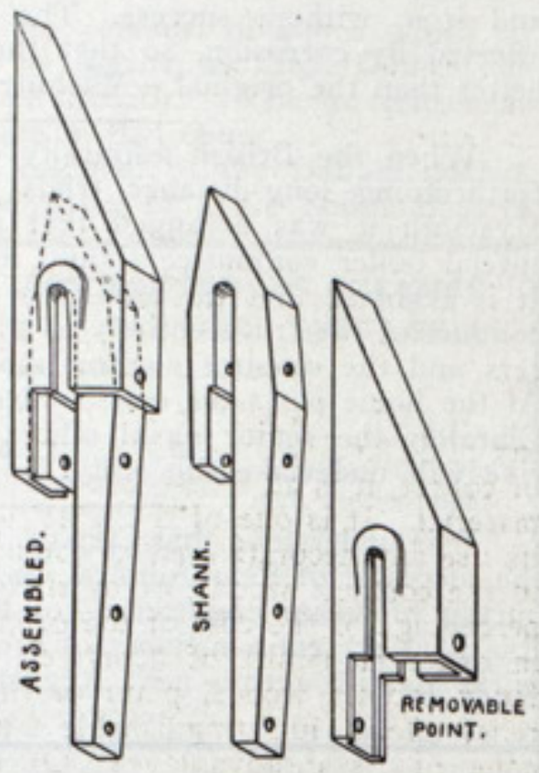
across the Chicago River at entrance to the Grand Central Station, Chicago, before and after the removal of the old center pier swing bridge, showing the obstruction to navigation caused by the center pier and protection pier of the old swing bridge, and the wide and unobstructed channel given by the new Scherzer Rolling Lift Bridge.

Preliminary Sketches and estimates of cost furnished without charge to responsible parties in any part of the world, upon request accompanied by the necessary data.

THE SCHERZER ROLLING LIFT BRIDGE CO., Main Offices: 1616 Monadnock Block, CHICAGO, U.S.A.

PATENT DIPPER TOOTH.

The device illustrated herewith is a patent dipper tooth for dredges and steam excavators. It has been thoroughly tried. There is no question as to its practical advantages and it is rapidly coming into general use.



The Messrs. Pryor of Houghton, Mich., are well known to the dredging interests of the country. It is their device and it is manufactured and sold by the Pryor Patent Excavator Tooth Co. of Houghton. It was gotten up by Joseph F. Pryor and James Pryor in 1896 and was not put on the market until they were fully satisfied as to its success. Mr. A. T. Pryor, who has operated dredges with the device, is now on a tour of Canada and the United States introducing it. James Pryor, who was superintendent of the Portage Lake ship-canals, and who was succeeded by the present incumbent, Major Marr, is now engaged in dredging and other work at various ports on the lakes under government contracts.

This excavator tooth is made entirely of open-hearth steel in two parts, a shank and a removable point. The shank is bolted onto the dipper in the usual way and remains stationary, while the removable point is placed over the shank and is bolted thereto. A full set of four points can be changed in from ten to fifteen minutes, whereas it takes a much longer time to change a full set of the old style cumbersome iron teeth. It is claimed that the teeth will wear 100 per cent. longer that the iron teeth, steel tipped, and will increase the capacity of a dredge materially in hard digging. Teeth of different sizes can be made to suit any size bucket. A catalogue, which gives different weights and styles for the different kinds of work they have to perform, will be furnished on application to the company.

The wreck of the battleship Maine, which has been lying in Havana harbor since 1898, is to be removed.

LIGHTHOUSE ESTABLISHMENT,
OFFICE OF ENGINEER, NINTH LIGHTHOUSE DISTRICT,
CUSTOM HOUSE, MILWAUKEE, WIS., FEB. 17, 1903.

POSITIONS IN THE LIGHTHOUSE SERVICE.

Notice is hereby given that an examination will be held at this office for the purpose of perfecting an eligible list for the positions of Master, Mate, Second Mate, Engineer and Assistant Engineer on the Lighthouse Tender in this district, which includes Lake Michigan, Green Bay and tributary waters lying west of a line drawn across the Straits of Mackinac at Mackinac Point, Michigan; also for the positions of superintendents, masons, bricklayers, plasterers, carpenters and painters in the lighthouse service in this district.

One position of superintendent will require a machinist who understands the construction and repair of boilers and machinery.

The other position of superintendent will require a general knowledge of building construction, qualities of material and ability to handle working force.

Persons who wish to apply for the foregoing positions should obtain the proper blank forms of application from this office, either in person or by mail, and after filling them out return them to this office.

Applicants need not appear in person.

Thirty days from the date of this notice, all applications received will be examined, the applicants graded according to merits and a list of those eligible for appointment sent to the Lighthouse Board.

J. G. WARREN,
Major, Corps of Engineers U. S. A.,
Engineer, Ninth Light-House District,
Chairman, Local Civil Service Board.

d. Mar. 12.

STAGES OF WATER.

Gage records of the United States lake survey show the following mean stages of water above mean sea-level:

December, 1902.—Lake Superior. 602.12 ft.; Lakes Huron and Michigan, 579.46 ft.; and Lake Erie, 571.91 ft. These stages show Lake Superior to have been the same as during same month last year, and 0.16 ft. higher than during December, 1895; Lakes Huron and Michigan were 0.11 ft. lower than during same month last year, and 0.87 ft. higher than in December, 1895; Lake Erie was 0.63 ft. higher than during same month last year, and 0.96 ft. higher than in December, 1895.

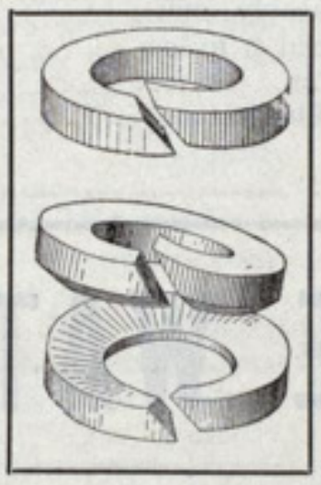
January, 1903.—Lake Superior, 601.81 ft.; Lakes Huron and Michigan, 579.26 ft.; and Lake Erie. 571.81 ft. These stages show Lake Superior to have been 0.05 ft. higher than during same month last year. and 0.13 ft. lower than in January, 1895; Lakes Huron and Michigan were 0.16 ft. lower than during same month last year, and 0.26 ft. lower than in January, 1895; Lake Erie was 0.64 ft. higher than during same month last year, and 0.49 ft. higher than in January, 1895.

The Baltimore Marine Railway Machine & Boiler works, Baltimore, Md., has laid the keel for a large fishing steamer for Capt. J. E. Haynie.

The Maryland Steel Co., Sparrows Point, Md., launched the Atlantic Transport Line's steamer Maine last week. She is 507 ft. long 58 ft. beam, and will have a carrying capacity of 10,000 tons.

The New England Ship Building Co. of Bath, Me., has received a contract from Capt. George W. Elzey of Bethel, Del., to build a four-masted schooner of 170 ft. length, 37 ft. beam and 13 ft. depth.

"VULCABESTON"
CONCAVE and CONVEX
PACKING RINGS



Used by representative power stations and steam plants for the Piston Rod, Reciprocating and Corliss Valve Stem and Throttle Stem Packing on stationary engines. Will not score the rod. Readily conform to any unevenness in the rod and greatly reduce friction.

Made in pairs Concave and Convex split diagonally, opened laterally and sprung over the rod. This formation tends to press the Convex Rings closely to the rod and the Concave Rings to the box, preventing leakage of steam at either side. Practically indestructible. Will pack satisfactorily against high pressure or superheated steam, and work perfectly in vacuum.

SEND FOR CATALOGUE "V"

SHEET PACKING
30 to 50 per cent. cheaper than rubber or composition packing More durable and efficient.

ROPE PACKING
Braided from pure Asbestos yarn vulcanized with Rubber.

NEW YORK MILWAUKEE CHICAGO ST. LOUIS BOSTON
H. W. JOHNS-MANVILLE CO 100 WILLIAM ST. NEW YORK
PHILADELPHIA CLEVELAND PITTSBURG NEW ORLEANS LONDON

ELIAS GUNNELL, PRESIDENT. THOS. J. PRINDIVILLE, VICE-PRESIDENT. L. E. GEER, SEC'Y AND TREAS. CHARLES C. WEST, MANAGER.

MANITOWOC DRY DOCK COMPANY,
SHIP BUILDERS.
FACILITIES FOR REPAIRS OF STEEL AND WOODEN VESSELS.
DRY DOCKS AND MAIN OFFICE: MANITOWOC, WIS.
GEO. B. BURGER, SUPT.
BRANCH YARD: 34 ROBERTS STREET, CHICAGO.
THEODOR KNUDSON, SUPT.

United Marine Mfg. & Supply Co.,
MANUFACTURERS OF AND DEALERS IN
ELECTRICAL MATERIAL
FOR SHIPS AND FORTIFICATIONS.
ALBERT C. JAHL, General Manager,
100 William St., New York, U. S. A.

BURNING BRASS TIPS ON CAST IRON PROPELLERS.

A method of repairing cast iron propeller wheels is in vogue at Mort's Dock & Engineering Co.'s foundry, Sidney, N. S. W., which is said to be practically unknown in Europe and America. It is the fusion of gun-metal tips to cast iron propeller blades by the "burning-on" process. On account of cost, cast iron propellers are used to a large extent, although they are, of course, much inferior to bronze in point of durability. The "tips," the portion 12 to 18 in. from the ends of the blades, are likely to be broken by striking floating debris, hidden rocks, wharf projections, "racing," etc., but the greatest source of damage in the case of steel and iron vessels is corrosion due to galvanic action. When a propeller blade is broken the usual method of repair is to replace it with a new one, but it sometimes happens that a ship cannot be detained in port long enough to allow a new blade to be made, and in that case a new tip is "burned on," which can be done in a few hours. The blade to be repaired is taken to a drilling machine and drilled across with holes about ½ in. apart, so that the bad part may be easily broken off. It is then taken into the iron foundry, bedded in the floor, and a cope rammed up over the portion that is to be renewed. The mold is then parted, finished, dried, closed and cast with gun metal in place of the cast iron tip which has been broken off. The gun metal having been cast against the cast iron blade, it has now to be "burned" to it. The cope is thrown off while the casting is hot, and an "open" burn laid right across where the brass and iron join. It is then burned with iron, care being taken that the metal from the ladle falls directly onto the iron part of the blade so as to cut into it without washing away too much of the brass. If attention is given to the center, or thickest part of the blade, in the process of burning, one can always make sure of a satisfactory joint. The proper way is to use a feeding rod as a guide, working it along the joint gradually as the iron dissolves. After the burn is thoroughly cooled it is trimmed off, and the blade sent to the ship. Although a blade treated in this way presents a somewhat piebald appearance—owing to the light and shade of brass and iron—there is nothing weak about it. All sorts of mechanical tests have been made in order to separate the brass and iron, without success. The bronze tip is not, of course, affected by corrosion, so that the repaired blade is practically better than the original.—Machinery.

When the British admiralty drew up the program for the forthcoming long-distance trials of the cruisers Minerva and Hyacinth it was arranged that at least two members of the special boiler committee should make the passage in each ship. It is reported that the admiralty has now decided to leave the conduct of the trials entirely in the hands of the ships' own officers and the umpires at Portsmouth, Devonport and Gibraltar. At the home ports the commanders-in-chief will be umpires; at Gibraltar the senior naval officer present when the vessels arrive will undertake this duty.

It is understood that Com'dr. C. W. Rae has been selected as the successor of Rear Admiral George W. Melville as chief of the bureau of steam engineering of the navy department. Com'dr. Rae is at present a member of the examining board. Rear Admiral Melville retires next August.

Tug for Sale.

Tug Norris.—47 ft. long, 12 ft. beam, draught only 4 ft. Hull thoroughly rebuilt last winter. Boiler 44 in. diameter by 7 ft. high. Allowed 150 lbs. pressure. Engine 8x8. Boiler and engine nearly new and in first class condition. Speed 9 miles per hour. Plenty of deck room. Write for further particulars Hardy & Dischinger, Toledo, Ohio. Mar. 5.

If you want to KNOW WHY

Dearing Water Tube Boilers are best? ? ?

Drop us a postal

Dearing Water Tube Boiler Company

288 to 296 Fort St., West. DETROIT, MICH.

BELLEVILLE WATER-TUBE BOILERS

NOW IN USE (AUGUST, 1902)

On Board Sea-going Vessels, NOT INCLUDING New Installations Building or Erecting.

French Navy	268,020 H. P.
English Royal Navy	745,900 "
Russian Imperial Navy	184,900 "
Japanese Imperial Navy	110,700 "
Austrian Imperial Navy	32,900 "
Italian Royal Navy	13,500 "
Chilian Navy	26,500 "
Argentine Navy	13,000 "
The "Messageries Maritimes" Company	87,600 "
Chemins de fer de l'Ouest: (The French Western Railway Co.) Steamships plying between Dieppe and Newhaven	18,500 "
Total Horse Power of Boilers in Use	1,501,520

WORKS: Ateliers et Chantiers de l'Ermitage, at Saint-Denis (Seine), France.

TELEGRAPHIC ADDRESS: Belleville, Saint-Denis-Sur-Seine.

Capt Chas. Keller, United States engineer at Grand Rapids, will open proposals March 11 for dredging harbors on the east shore of Lake Michigan.

A dredging job involving the removal of about 40,000 cu. yds. at Ashland, Wis., will be let Mar. 9 by Capt. D. D. Gaillard, United States engineer at Duluth. The advertisement calling for bids appears elsewhere in this issue.

Major Thos. W. Symons, engineer of the Buffalo district, has prepared plans for pier extension at Little Sodus Bay, N. Y., and for breakwater extension at Cape Vincent, N. Y. He advertises elsewhere in this issue for bids on the work.

At a meeting of creditors of the W. R. Trigg Co., Richmond, Va., practically all the local creditors accepted a plan to pay all creditors who have claims of more than $100 one-third in cash and the remainder in common stock of a new company to be organized immediately upon the approval of the plan by out-of-town creditors. It was stated authoritatively that the United States Ship Building Co. had nothing to do with the new company.

Official figures are published by the New York Central of the remarkable run made by the Empire State Express on Jan. 1 last when the distance from Albany to Buffalo, 302 miles, was made in 295 minutes. The run between Syracuse and Rochester was made at a clip of 67.60 miles per hour, average speed. The run between Palmyra and Mecedon was at the rate of 109.35 miles per hour. This run was made by engine No. 2,929, newest of the Central Atlantic type, the latest product of the American Locomotive Co. This engine came out of the works at Schenectady only ten days before making the run.

FOR SALE THIS PASSENGER STEAMER AT A BARGAIN. MUST SELL AT ONCE . . . . . .

Fully equipped with electric lighting plant. 10 inch search-light.

Length 76 feet, draught 6 ft. 4 in., rebuilt spring 1902.

For full particulars, address

W. R. GREGORY,
810 Royal Insurance Building,
CHICAGO ILL.
Feb. 26

"Seaboard Steel Castings"

A Guarantee of Quality.

Open Hearth Steel Castings of the Highest Grade for Locomotive, General Machinery and Shipbuilding Work.

Subject to U. S. Government, Lloyds, Railroad and Other Highest Requirements.

Seaboard Steel Casting Co., Chester, Pa.

Steamer for Sale Cheap.

Light draught steamer C. W. Liken, 79 ft. over all, 18 ft. beam. Engines, 12 ft. square. In good condition. For further particulars address A. Wheeler, Bay City, Mich. Mar. 5.

PITTSBURGH WHITE METAL CO.

MANUFACTURERS OF THE BEST

BABBITT and ANTI-FRICTION

Metals

Known for any Purpose.

Made from the Best Materials.

Price and Quality Guaranteed and Always Consistent with the Market.

PITTSBURGH, - PA.

PNEUMATIC TOOLS

FOR ALL PURPOSES SIMPLEST AND BEST

RAILWAY APPLIANCES COMPANY

CONSOLIDATED WITH THE Q-C COMPANY

GENERAL OFFICES OLD COLONY BUILDING CHICAGO.

NEW YORK OFFICES 114 LIBERTY ST.

Boiler and Engine For Sale.

Both in first-class condition. Boiler 10½ ft. in diameter and 14 ft. long; 120 lbs. steam allowed. Fore and aft compound engine; high-pressure, 22 in. diameter low-pressure, 44 in., with 36 in. stroke. Address Barry Trans. Co., East End Michigan St., Chicago, Ill. Mar 19

Passenger Steamer Wanted.

Wanted.—Steamer for excursion business between Milwaukee, Wis., and Whitefish Bay, Wis., May 1 to Sept. 1. Depth of water, 10 ft. To carry from 800 to 1,000 persons. Address, Henry Kanopka, Whitefish Bay, Wis. Feb. 12.

U. S. Engineer Office, Duluth, Minn., Jan. 24, 1903. Sealed proposals for furnishing and placing about 26,000 tons of riprap at Ashland, Wis., will be received here until noon, Feb. 24, 1903 and then publicly opened. Information on application. D. D. GAILLARD, Capt., Engrs Feb. 19

Sealed proposals will be received at the office of the Light House Engineer, Detroit, Mich., until 3 o'clock p. m. on Monday, March 2, 1903, and then opened, for furnishing the material and labor necessary for removing the wooden superstructure of the foundation pier of the Cheboygan Crib Light Station, Mich., and rebuilding the same in concrete and masonry. Information furnished on application to Captain LANSING H. BEACH, Corps of Engineers, U. S A., Engineer, 11th Light House District Feb. 19.

U. S. Engineer Office, Duluth, Minn., Feb. 5, 1903. Sealed proposals for purchase of U. S. steam yacht "Picket" will be received here until 10 a. m., Feb. 25, 1903, and then publicly opened. Information on application. D. D. GAILLARD, Capt., Engrs. Feb. 19

U. S. Engineer Office, Grand Rapids, Mich., Feb. 12, 1903. Sealed proposals for construction of steel hulled inspection and survey boat will be received here until 3 p. m., Feb. 27, 1903, and then publicly opened. Information furnished on application. CHAS. KELLER, Capt., Engrs. Feb. 19.

Sealed proposals will be received at the office of the Light House Engineer, Buffalo, N. Y., until 12 o'clock m., of Thursday, Mar. 5, 1903, and then opened, for furnishing the materials and labor necessary for the construction of a keeper's dwelling at South Buffalo light station, N. Y., in accordance with specifications, copies of which, with blank proposals and other information, may be had upon application to Major T. W. SYMONS, U. S. A., Engineer. Feb. 26.

U. S. Engineer Office, Milwaukee, Wis., Jan. 31, 1903. Sealed proposals for building crib piers, crib breakwater, pile revetment, removal of portion of old pier, and dredging at Waukegan Harbor, Ill , will be received here until 3 o'clock, p. m., March 2, 1903, and then publicly opened. Specifications, blank forms, and all available information will be furnished on application to this office. J. G. WARREN. Major, Engineers. Feb 26.

Wanted.

"Wanted" and "For Sale" advertisements are published in the Marine Review at the rate of $1 per inch per issue. Try it, and get quick results. Marine Review Pub. Co., 39-41 Wade Bldg., Cleveland, O.

U. S. Engineer Office, Milwaukee, Wis., Jan. 31, 1903. Sealed proposals for furnishing Oregon fir timber and plank will be received here until 3 o'clock, p. m., March 2, 1903, and then publicly opened. Specifications, blank forms, and all available information will be furnished on application to this office. J. G. WARREN, Major, Engineers. Feb. 26.

U. S Engineer Office, Milwaukee, Wis., Jan. 31, 1903. Sealed proposals for building crib piers at Sheboygan Harbor, Wis., will be received here until 3 o'clock, p. m., March 2, 1903, and then publicly opened. Information furnished on application. J. G. WARREN, Major, Engineers. Feb. 26.

U. S. Engineer Office, Milwaukee, Wis., Jan. 31, 1903. Sealed proposals for building crib breakwater at Manitowoc Harbor, Wis., will be received here until 3 o'clock, p. m., March 2, 1903, and then publicly opened. Information furnished on application. J. G. WARREN, Major, Engineers. Feb. 26.

U. S. Engineer Office, Milwaukee, Wis., Jan. 31, 1903. Sealed proposals for dredging and rock removal at Sturgeon Bay and Lake Michigan Ship Canal, Wis., will be received here until 3 o'clock, p. m , March 2, 1903, and then publicly opened. Specifications and all available information will be furnished on application to this office. J. G. WARREN. Major, Engineers. Feb. 26,

U. S. Engineer Office, Duluth, Minn., Feb. 6, 1903. Sealed proposals for dredging about 40,000 cu. yds. at Ashland, Wis., and Ontonagon, Mich., will be received here until 10 a. m., Mar. 9. 1903, and then publicly opened. Information on application. D. D. GAILLARD, Capt., Engrs. Mar 5

U. S. Engineer Office, 57 Park st., Grand Rapids, Mich., Feb. 9, 1903. Sealed proposals for dredging harbors on east shore of Lake Michigan will be received here until 3 p. m., Mar. 11, 1903, and then publicly opened. Information furnished on application. CHAS. KELLER, Capt., Engrs. Mar. 5.

U. S. Engineer Office, Duluth, Minn., Feb. 7, 1903. Sealed proposals for building in place the concrete south pier at Superior Entry, Wis., will be received here until noon, Mar. 9, 1903, and then publicly opened. Information on application. D. D. GAILLARD, Capt., Engrs. Mar. 5.

U. S. Engineer Office, Buffalo, N. Y., Feb, 3, 1903. Sealed proposals for pier extension at Little Sodus Bay, N. Y., and breakwater extension at Cape Vincent, N. Y., will be received here until 11 a. m., Mar. 5, 1903, and then opened; information furnished on application. T. W. SYMONS, Major, Engrs. Mar. 5.

U. S. Engineer Office, Grand Rapids, Mich., Feb. 2, 1903. Sealed proposals for repair of piers at Pentwater and White Lake, Mich , and repair of piers and revetment at Charlevoix, Mich., will be recevied here until 3 p.m., March 4, 1903, and then publicly opened. Information furnished on application. CHARLES KELLER, Capt., Engrs. Feb. 26.

ANTONIO C. PESSANO,
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Secretary-Treasurer.

GREAT LAKES ENGINEERING WORKS

DETROIT, MICH.

Steel Ship Builders—

We have under construction a complete Ship Building Plant, modern in every detail and capable of handling the LARGEST SHIPS which the trade of the Great Lakes will require; also

Floating Dock—

A Floating Dock of all steel construction and equipped with the best pumping machinery and appurtenances, and with a capacity for Docking the largest Boats afloat or which may be built.

Marine Engines—

We build High Grade Engines for Lake and Ocean Service.

Propeller Wheels—

Improved designs of high efficiency, made of Semi Steel, either whole or sectional.

Hydro Carbon System—

We are the sole owners of the rights for applying this system to the Steamers of the Great Lakes. If your boilers are using too much coal, if you are short of steaming capacity, if you want to convert the objectionable black smoke into money, the HYDRO CARBON SYSTEM should receive your attention, as it successfully and economically handles each of the above cases.

Hydraulic Dredges—

We build all sizes for any service.

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and Supplies of all kinds, and Heavy Forgings.

There's Only One "American"

The only genuine American Asbesto-Metallic Packing comes in boxes like the one shown here. That's the way to tell it in buying it. It's easy enough to tell it in using it, but sometimes that's too late.

American Asbesto - Metallic, like everything truly "American," is made for work under high pressure.

You know how it's built—rubber core of our famous **I** shape non-vulcanizing compound—that's for resilience. Asbestos over this to keep it from burning. Flax and soft wire over all to give it long life and happiness to the user.

We make other kinds of packings, too—every good kind. We are headquarters for everything in packing.

Get our catalog and prices.

AMERICAN STEAM PACKING COMPANY

60 Federal Street, Boston, Mass.
14 North Canal Street, Chicago, Ill.
712 Post Street, Seattle, Wash.
35 Dey Street, New York.
292 Mission Street, San Francisco.
28 Victoria St., London, S. W., Eng.

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STORES anything of value for any length of time. Individual safes in a burglar-proof and fire-proof vault. Largest and best safe deposit equipment in Ohio.

The Cleveland Trust Company

121 EUCLID AVENUE, AT THE CORNER OF BOND STREET.

Commenced Business June 3, 1901.

4 Per Cent. on Savings.

THE FEDERAL TRUST CO. CLEVELAND.

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CAPITAL $1,500,000.

Surplus and Undivided Profits (Earned) $152.000.

Pays Interest on Check Accounts.
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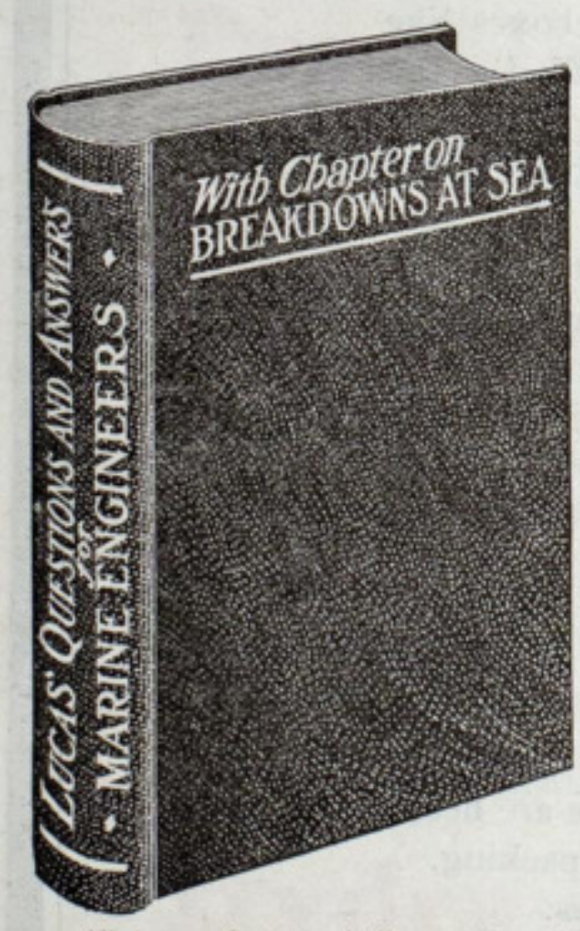

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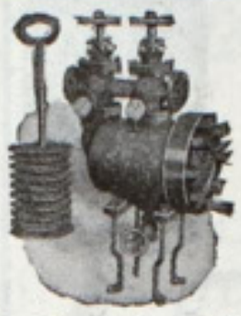

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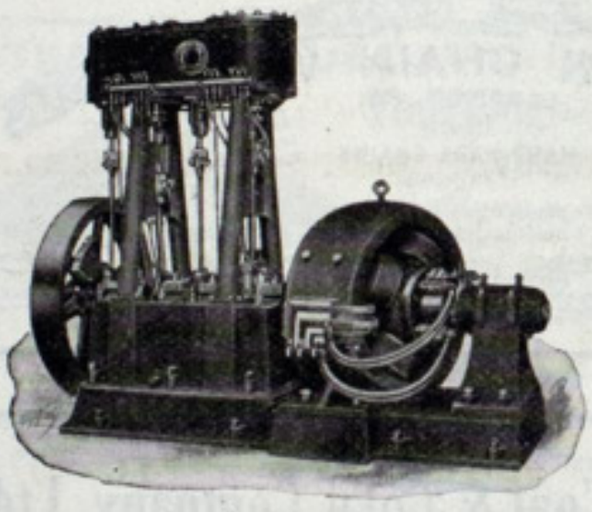

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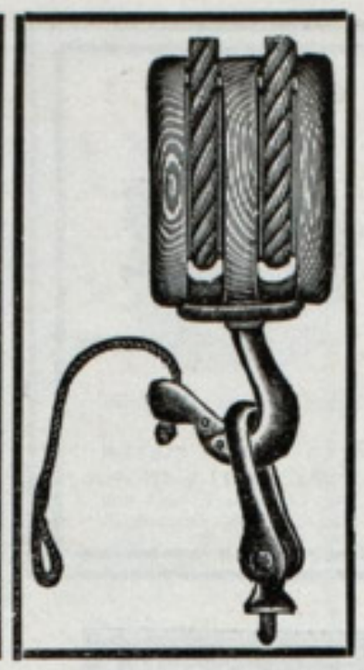

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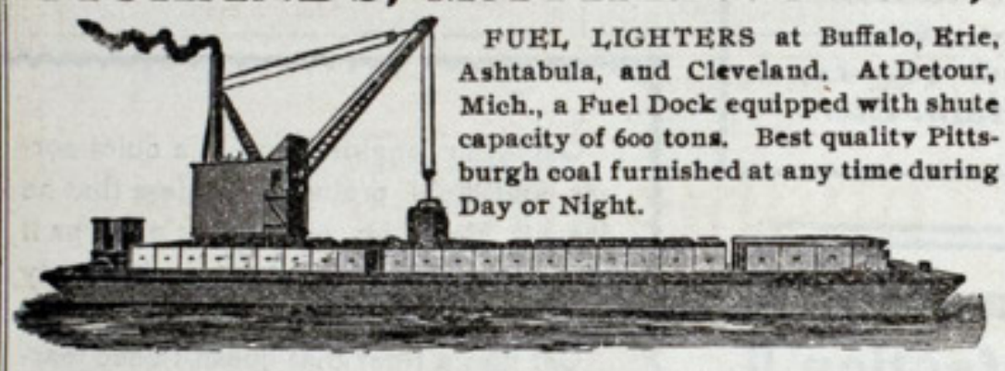

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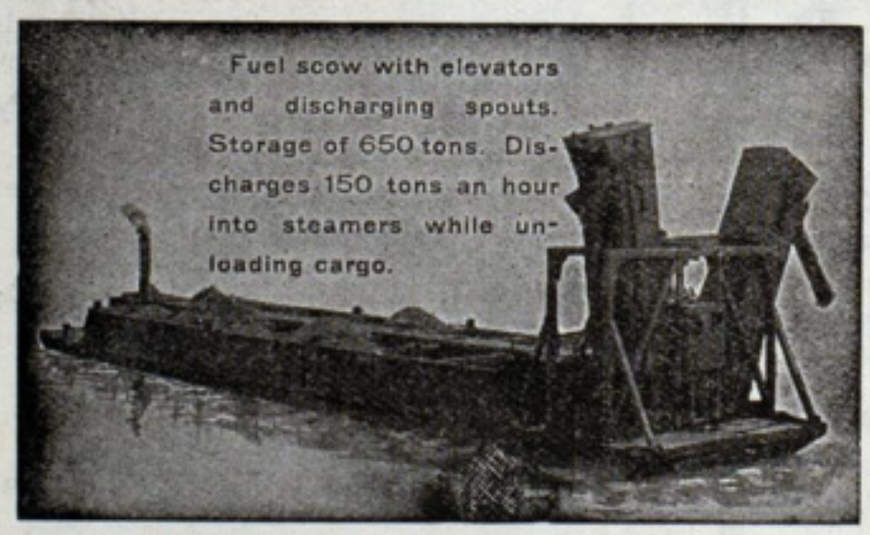

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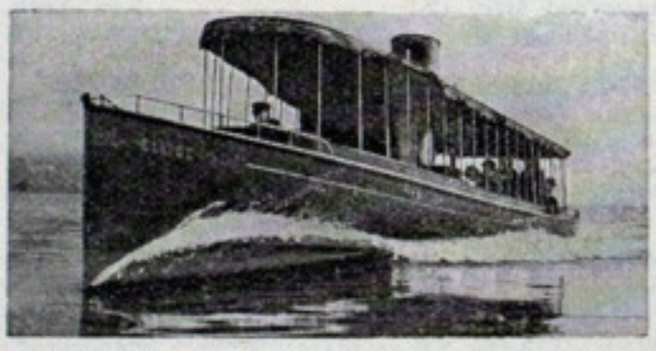

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Steamer Ogantz, 80 ft. keel, 18 ft. 8 in. beam, 7 ft. 6 in. draught. Fore and aft compound engine, 14 and 25 by 16 in. Scotch boiler, 10 ft. by 84 in., allowed 125 lbs. steam. Passenger allowance—45 regular and 190 excursion.

Tug Dan Connelley, 65 ft. keel, 16 ft. 6 in. beam. 8 ft. 6 in. draught. Iron boiler 13½ ft. by 76 in., allowed 90 lbs. steam. Double engine, 14x15 in.

These boats were in commission last season and are in good condition. Price reasonable. For particulars address The Sandusky Fish Co., Sandusky, O. tf

Schooner for Sale.

Schooner carrying 150 M. ft. of lumber or 90 cords of maple wood. Will be sold cheap for cash. For full particulars, address Box 37, Marine Review Pub. Co., Cleveland, O. tf

Marine Fire Box Boiler For Sale.

Allowed 120 lbs. steam, 15 ft. 6 in. long, 10 ft. dia. Taken out of boat this winter on account of being too small. On the dock at foot of Second street, Bay City. Address O. W. Blodgett, Bay City, Mich. Feb. 19

Steamer for Sale.

For Sale.—Steamer City of Grand Rapids. In good condition and will sell at a bargain. For particulars address Barry Trans. Co., Chicago, Ill. Mar. 5.

MARINE BOILER FOR SALE.

One 200 H. P. Wickes Water Tube Marine Boiler.

IMMEDIATE DELIVERY.

WICKES BROS., SAGINAW, MICH. t. f.

Barge Wanted.

Wanted to buy tow barge that will carry 500 M. to 600 M. ft. of lumber. Canadian register preferred. Address Canada, care Marine Review Pub. Co., 39-41 Wade Bldg., Cleveland, O. Feb. 26.

Tug Wanted.

Wanted—A tug about 65 ft. long with draught not exceeding 7 ft. Must be strongly built and in good condition, with good towing power for its size. British bottom preferred. Address The Lake Superior Timber Co., Ltd., Port Arthur, Ont. Feb. 19.

Tug Wanted.

Wanted to purchase tug about 75 to 80 ft. long, 18 to 20 ft. beam, and 9 to 11 ft. depth; compound engine; good power. Address Powell & Mitchell, Marquette, Mich. tf.

Steamer Wanted.

Wanted—To buy or lease steamer for ferry service at Duluth ship canal, Should accommodate from 300 to 600 passengers. Write and send photograph to Inter State Traction Co., Duluth, Minn. tf.

Almy Boiler For Sale.

One Class D. boiler of Almy type, rated 62 H. P., having 15½ sq. ft. of grate surface and 600 ft. of heating surface. Dimensi ns; 58½ in. wide, 58½ in. long, and 81 in. ...gu. Complete trycock, check valve, blow-off valve and consolidated safety valve. This boiler tested with 600 lbs. hydrostatic pressure; working pressure 330 lbs.; insured at this pressure. For further information and price address, Box 38, Marine Review Pub. Co., 39-41 Wade Bldg., Cleveland O. Mar. 1

Schooner for Sale.

For Sale.—Schooner Bertha Barnes. Capacity 425 M. ft. of lumber. For particulars apply to James A. Myers, Royal Insurance Bldg., or L. Sargisson, 905 St. Louis ave., Chicago. tf.

Steamer For Sale.

For sale at a bargain, steamer Cambria, a Canadian boat, 206 ft. long and 40 ft. beam, fitted with feather dip paddles, electric lighting plant; fully equipped with all sailing appliances; used for both passenger and freight purposes. Will sell for $3,000.00 Address, Frank Lenahan & Son, 53 Fulton St., Buffalo, N. Y. tf.

Two Tugs For Sale.

Tug John Johnson—Engine 20½x22; boiler allowed 120 lbs. steam. Tug Warwick—Engine 15 by 17; boiler allowed 110 lbs. steam. Both boats, engines and boilers practically new and in first-class condition. Boats can be seen at Toledo any time. Cheap for cash. Enquire of James Rooney, 1118 Collingwood Ave., Toledo, O. tf

For Sale.

Steamer Aztec and schooner Miztec. Carrying capacity—Aztec 1,100 tons ore, Miztec 1,500 tons ore. Laid up at Toledo, O. Address C. H. Burchinal, 210 Valentine Bldg., Toledo, O. Mar 8

FOR SALE.

STEAMBOAT ENGINES.

Two pair 7 x 9 double cylinder vertical reversible **steam engines** of the Crane elevator engine style. Send for blue print, photos and price. Also **pumps, condensers** and **small engines for electric lights.**

CLYDE MACHINE WORKS
33d St. and Shields Ave. - Chicago, Ill.

BUYERS' DIRECTORY OF THE MARINE TRADE.

For a more complete classification than that represented by advertisers in the Marine Review and Marine Record, see the BLUE BOOK OF AMERICAN SHIPPING, marine and naval directory of the United States, published by the Marine Review Pub. Co., 39-41 Wade Bldg., Cleveland.

See accompanying index of Advertisers for full addresses of concerns in this directory.

AIR COMPRESSORS, AIR HOISTS, ETC.

Chicago Pneumatic Tool Co.....Chicago.
"Long Arm" System Co.....Cleveland.

AIR PUMPS AND APPLIANCES.

Fore River Ship & Engine Co.....Quincy, Mass.

ANCHORS.

Baldt Anchor Co.....Chester, Pa.
Bowers, L. M. & Co. .....Binghamton, N. Y.
DeGrauw, Aymar & Co. .....New York.
Seaboard Steel Casting Co.....Chester, Pa.

ANTI-FRICTION METALS.

Cramp, Wm. & Sons.....Philadelphia.
Hardy, Wm. A.....Fitchburg, Mass.
Phosphor Bronze Smelting Co., Ltd....Philadelphia.
Pittsburg White Metal Co. .....Pittsburg, Pa.

ARTIFICIAL DRAFT FOR BOILERS.

American Ship Building Co.....Cleveland.
Bloomsburg & Co., H.....Newport News, Va.
Buffalo Forge Co.....Buffalo.
Detroit Shipbuilding Co.....Detroit.
Sturtevant, B. F. Co.....Boston.

ASBESTOS.

Johns-Manville Co., H. W.....New York.

ATTORNEYS AND PROCTORS IN ADMIRALTY.

Bacon, H. H.....Buffalo.
Brown, Harvey L.....Buffalo.
Gilchrist, Albert J.....Cleveland.
Goulder, Holding & Masten.....Cleveland.
Hoyt, Dustin & Kelley.....Cleveland.
Kremer, C. E. .....Chicago.
MacDonald, Ray G.....Chicago.
McPherson, Clark, Campbell & Jarvis.....Toronto.
Pinney & Warner.....Cleveland.
Shaw, Warren, Cady & Oakes.....Detroit.
Spencer, H. R.,.....Duluth.
White, Johnson, McCaslin & Cannon.....Cleveland.

BANKERS.

Fahey & Co.....Cleveland.
Federal Trust Co. ..... Cleveland.
Cleveland Trust Co.....Cleveland.

BAROMETERS, MARINE GLASSES, ETC.

Bliss, John & Co.....New York.
Coe, Almer..... Chicago.
Ritchie, E. S. & Sons.....Brookline, Mass.

BELTING, RUBBER.

New York Belting & Packing Co.....New York.

BLOCKS, SHEAVES, ETC.

Boston & Lockport Block Co.....Boston, Mass.
Cleveland Block Co.....Cleveland.

BLOWERS.

Buffalo Forge Co.....Buffalo.
Sturtevant, B. F. Co.....Boston.

BOAT BUILDERS.

Drein, Thos. & Son.....Wilmington, Del.
Kahnweiler's Sons, David.....New York.
Lane & DeGroot.....Long Island City, N. Y.
Marine Construction & D. D. Co., ...Mariner's Harbor, S. I., N. Y.
Marine Iron Works.....Chicago.
Truscott Boat Mfg. Co.....St. Joseph, Mich.
Warrington Iron Works..... .....Chicago.
Willard, Chas. P. & Co.....Chicago.

BOILER MANUFACTURERS.

Almy Water Tube Boiler Co.....Providence, R. I.
American Ship Building Co.....Cleveland.
Atlantic Works.....East Boston, Mass.
Babcock & Wilcox Co.....New York.
Bath Iron Works, Ltd.....Bath, Me.
Boyer's Sons, L.....New York.
Chicago Ship Building Co.....Chicago.
Clyde Machine Works.....Chicago.
Cramp, Wm. & Sons.....Philadelphia.
Dearing Water Tube Boiler Co.....Detroit.
Delauney Belleville & Co.....St. Denis, France.
Detroit Shipbuilding Co.....Detroit.
Fletcher, W. & A. Co.....Hoboken, N. J.
Fore River Ship & Engine Co.....Quincy, Mass.
Harlan & Hollingsworth Co.....Wilmington, Del.
Jenks Ship Building Co.....Port Huron, Mich.
Kingsford Foundry & Machine Works..Oswego, N. Y.
Lake Erie Boiler Works.....Cleveland.
MacKinnon Mfg. Co.....Bay City, Mich.
Maryland Steel Co.....Sparrow's Point, Md.
Milwaukee Dry Dock Co. .....Milwaukee.
Moran Bros. Co.....Seattle, Wash.
Mosher, Chas. D.....New York.
Neafie & Levy Ship & Engine Building Co...Phila.
Newport News Ship Building Co..Newport News, Va.
Nixon, Lewis .....Elizabeth, N. J.
Pusey & Jones Co.....Wilmington, Del.
Risdon Iron Works .....San Francisco.
Roberts Safety Water Tube Boiler Co...New York.
Stirling, The Co.....Chicago.
Superior Ship Building Co.....Superior, Wis.
Taylor Water Tube Boiler Co.....Detroit.
Trigg, Wm. R Co.....Richmond, Va.
Union Machine & Boiler Co.....Cleveland.
Warrington Iron Works.....Chicago.
Willard, Chas. P. & Co .....Chicago.

BOILER COMPOUNDS.

Dearborn Drug & Chemical Works.....Chicago.

BOILER COVERING.

Johns-Manville Co., H. W.....New York.

BOILER RIVETS.

Bourne-Fuller Co.....Cleveland.

BOILER STAYBOLTS, IRON OR STEEL, HOLLOW OR SOLID.

Falls Hollow Staybolt Co. .....Cuyahoga Falls, O.

BRASS AND BRONZE CASTINGS.

Cramp, Wm. & Sons .....Philadelphia.
Fore River Ship & Engine Co.....Quincy, Mass.
Macbeth Iron Co.....Cleveland.
Phosphor Bronze Smelting Co. .....Philadelphia.

BRASS—SHEET, ROD, ETC.

Waterbury Brass C .....New York.

BRASS WORK, MARINE.

Farnan Brass Works .....Cleveland.

BRIDGES, BUILDERS OF

Scherzer Rolling Lift Bridge Co. .....Chicago.

BUCKETS, ORE AND COAL.

Bartlett & Snow Co., C. O. .....Cleveland.
Brown Hoisting & Conveying Machine Co. Cleveland.
Lake Erie Boiler Works.....Cleveland.
Webster, Camp & Lane Co.....Akron, O.

CABIN AND CABINET FINISHING WOODS.

Martin-Barriss Co.....Cleveland.

CAPSTANS.

American Ship Windlass Co.....Providence, R. I.
Hyde Windlass Co. .....Bath, Me.

CAST IRON PIPE.

Wood & Co., R. D. .....Philadelphia.

CEMENT, IRON, FOR REPAIRING LEAKS.

Smooth-On Mfg. Co. .....Jersey City, N. J.

CHAINS.

Lebanon Chain Works.....Lebanon, Pa.
Standard Chain Co. .....Pittsburg.

CHAIN HOISTS.

Boston & Lockport Block Co. .....Boston, Mass.
Dake Engine Co,.....Grand Haven, Mich.

CHARTS.

Marine Review Pub. Co.....Cleveland.
Potter, J. D.....London.

CIRCULATOR, EQUILIBRIUM,

With Steam Heating Attachment.
Bloomsburg & Co., H. .....Baltimore, Md.

CLOCKS (Marine), CHRONOMETERS, BELLS.

Ashton Valve Co. .....Boston.
Bliss, John & Co. .....New York.
Chelsea Clock Co. .....Boston.
Ritchie, E. S. & Sons.....Brookline, Mass.

COAL PRODUCERS AND SHIPPERS.

Castner, Curran & Bullitt .....Boston.
Graham Coal & Coke Co., Ltd.....Detroit.
Hanna, M. A. & Co. .....Cleveland.
Pickands, Mather & Co. .....Cleveland.
Pittsburg Coal Co. .....Cleveland.
Rochester & Pittsburg Coal & Iron Co. ....Buffalo.

COAL AND ORE HANDLING MACHINERY.

Bartlett & Snow Co., C. O. .....Cleveland.
Brown Hoisting Machinery Co., (Inc.)...Cleveland.
Lidgerwood Mfg. Co.....New York.
Webster, Camp & Lane Co.....Akron, O.

COMPASSES.

Bliss, John & Co. .....New York.
Ritchie, E. S. & Sons.....Brookline, Mass.

CONDENSER TUBE PACKING.

Allen, Joseph .....Collingswood, N. J.

COPPER, TIN AND SHEET IRON WORK.

Lake Erie Boiler Works.....Cleveland.
McCutcheon, C. H.....Buffalo.
Topky Brothers .....Ashtabula, O.

COPPER—SHEET, TUBES AND ROD.

Waterbury Brass Co.....New York.

CORDAGE.

Baker & Co., H. H.....Buffalo.
DeGrauw, Aymar & Co.....New York.
Upson-Walton Co.....Cleveland.

CORK JACKETS AND RINGS.

Armstrong Cork Co. ....Pittsburg, Pa.
Kahnweiler's Sons, D. ....New York.
Lane & DeGroot .....Long Island City, N. Y.

CORRESPONDENCE SCHOOLS.

Chicago Nautical School.....Chicago.

CHAIN CONVEYORS, HOISTS.

Bartlett & Snow Co., C. O. .....Cleveland.
Brown Hoisting Machinery Co., (Inc.)...Cleveland.
Chicago Pneumatic Tool Co. .....Chicago.
General Electric Co. .....Schenectady, N. Y.
Lidgerwood Mfg. Co.....New York.
Railway Appliances Co .....Chicago.
Westinghouse Electric & Mfg. Co. .....Pittsburg.

DEAD-LIGHTS, AIR-PORTS, ETC.

"Long-Arm" System Co. .....Cleveland.

DIPPER TOOLS FOR DREDGES AND STEAM EXCAVATORS.

Pryor Patent Excavator Tooth Co..Houghton, Mich.

DRAWING MATERIALS.

Schwencke, Kirk & Co.....New York.

DIVING APPARATUS.

Morse, A. J. & Son.....Boston.
Schrader's Son, A. .....New York.

DRILL PRESSES—DRILLS OF ALL KINDS.

Cleveland Punch & Shear Works Co. ....Cleveland.
Railway Appliances Co .....Chicago.

DRYING APPARATUS.

Buffalo Forge Co.....Buffalo.
Sturtevant, B. F. Co. .....Boston.

DRY DOCKS.

American Ship Building Co. .....Cleveland.
Atlantic Works .....East Boston, Mass.
Baltimore Ship Building Dry Dock Co...Baltimore.
Bath Iron Works, Ltd. .....Bath, Me.
Buffalo Dry Dock Co. .....Buffalo.
Chicago Ship Building Co. .....Chicago.
Craig Ship Building Co. .....Toledo, O.
Cramp, Wm. & Sons .....Philadelphia.
Detroit Ship Building Co. .....Detroit.
Harlan & Hollingsworth Co. ....Wilmington, Del.
Lockwood Mfg. Co. .....East Boston, Mass.
Manitowoc Dry Dock Co.....Manitowoc, Wis.
Marine Construction & Dry Dock Co. ....New York.
Maryland Steel Co. .....Sparrow's Point, Md.
Milwaukee Dry Dock Co. .....Milwaukee.
Moran Bros. Co. .....Seattle, Wash.
Newport News Ship Building Co. Newport News, Va.
Nixon, Lewis .....Elizabeth, N. J.
Pusey & Jones Co. .....Wilmington, Del.
Shipowners Dry Dock Co. .....Chicago.
Superior Ship Building Co.....Superior, Wis.

ELECTRIC HOISTS AND CRANES.

Elwell-Parker Electric Co. .....Cleveland.
General Electric Co. .....Schenectady, N. Y.
Lidgerwood Mfg. Co.....New York.
Westinghouse Electric & Mfg. Co. ..Pittsburg, Pa.

ELECTRIC FIXTURES AND APPLIANCES.

General Electric Co. .....Schenectady, N. Y.
Seidler-Miner Electric Co. .....Detroit.
United Marine Mfg. & Supply Co.....New York.
Westinghouse Electric & Mfg. Co.....Pittsburg, Pa.

ELECTRIC LIGHT AND POWER PLANTS.

Buffalo Forge Co. .....Buffalo.
Electro-Dynamic Co. .....Philadelphia.
Elwell-Parker Electric Co. .....Cleveland.
General Electric Co. .....Schenectady, N. Y.
Seidler-Miner Electric Co.....Detroit.
Sturtevant, B. F. Co. .....Boston.
United Marine Mfg. & Supply Co.....New York.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

ELECTRIC STEERING GEAR, SPEED AND RUDDER INDICATORS, ETC.

Electro-Dynamic Co. .....Philadelphia.

ENGINE BUILDERS, MARINE.

American Ship Building Co.....Cleveland.
Atlantic Works .....East Boston, Mass.
Bath Iron Works, Ltd. .....Bath, Me.
Bell Engineering Works, David .....Buffalo.
Buffalo Forge Co. .....Buffalo.
Chicago Ship Building Co.....Chicago.
Chase Machine Co. .....Cleveland.
Craig Ship Building Co. .....Toledo, O.
Cramp, Wm. & Sons .....Philadelphia.
Dake Engine Co.....Grand Haven, Mich.
Detroit Ship Building Co. .....Detroit
Fletcher, W. & A. Co. .....Hoboken, N. J.
Fore River Ship & Engine Co.....Quincy, Mass.
Great Lakes Engineering Works.....Detroit, Mich.
Hall Bros. .....Philadelphia.
Harlan & Hollingsworth Co. ....Wilmington, Del.
Jenks Ship Building Co. .....Port Huron, Mich.
Lockwood Mfg. Co. .....East Boston, Mass.
MacKinnon Mfg. Co. .....Bay City, Mich.
Maryland Steel Co. .....Sparrow's Point, Md.
Milwaukee Dry Dock Co. .....Milwaukee.
Moran Bros. Co. .....Seattle, Wash.
Mosher, Chas. D. .....New York.
Neafie & Levy Ship & Engine Bldg. Co. Philadelphia.
Newport News Ship Building Co. Newport News, Va.
Nixon, Lewis .....Elizabeth, N. J.
Pusey & Jones Co. .....Wilmington, Del.
Risdon Iron Works .....San Francisco.
Roach's Ship Yard .....Chester, Pa.
Thropp, J. E. & Sons Co. .....Trenton, N. J.
Sheriffs Mfg. Co. .....Milwaukee.
Superior Ship Building Co.....Superior, Wis.
Trigg, Wm. R. Co.....Richmond, Va.
Trout, H. G. .....Buffalo.
Warrington Iron Works .....Chicago.
Willard, Chas. P. & Co. .....Chicago.

BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

ENGINE ROOM TELEGRAPH, CALL BELLS, ETC.
Cory, Chas. & Son .....New York.
Electro-Dynamic Co. .....Philadelphia.
MacLean Hydraulic Signal Co..... ... .Chicago.
Seidler-Miner Electric Co. .....Detroit.

ENGINEERING BOOKS.
Audel & Co., Theo.....New York.
Marine Review Pub. Co.....Cleveland.

ENGINEERING SPECIALTIES AND SUPPLIES.
Crane Co. .....Chicago.
Farnan Brass Works .....Cleveland.
Kieley & Mueller .....New York.
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Reilly Repair & Supply Co., James.....New York.

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Electro-Dynamic Co. .....Philadelphia.
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Gaskin, Edward .....Buffalo.
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Hunt, Robt. W. & Co. .....Chicago.
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Logan, Robert .....Cleveland.
Mosher, Chas D. .....New York.
Newman, R. L.....New York.
Pittsburg Testing Laboratory, Ltd.....Pittsburg.
Powell, Ambrose V. .....Chicago.
Roelker, H. B. .....New York.
Sadler, Perkins & Field.....New York.
See, Horace .....New York.
Wood, W. J. ....Chicago.

EVAPORATING AND DISTILLING APPARATUS.
Reilly Repair & Supply Co., James....New York.

FANS FOR VENTILATION, EXHAUST, ETC.
Buffalo Forge Co. .....Buffalo.
Sturtevant, B. F. Co. .....Boston.

FEED WATER PURIFIERS AND HEATERS.
Learmonth, Robert .....Buffalo.
Reilly Repair & Supply Co., James.....New York.
Ross Valve Co. .....Troy, N. Y.

FIXTURES FOR LAMPS, OIL AND ELECTRIC.
General Electric Co. .....Schenectady, N. Y.
Seidler-Miner Electric Co. .....Detroit.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

FORGES.
Buffalo Forge Co. .....Buffalo.
Sturtevant, B. F. Co. .....Boston.

FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.
Cleveland City Forge & Iron Co. .....Cleveland.
Fore River Ship & Engine Co. .....Quincy, Mass.
Macbeth Iron Co.....Cleveland.

FLUE WELDING.
Fix's, S. Sons .....Cleveland.

FURNACES FOR BOILERS.
Continental Iron Works.....New York.

FUELING COMPANIES AND COAL DEALERS.
Castner, Curran & Bullitt (Pocahontas) ....Phila.
Graham Coal & Coke co., Ldt.....Detroit.
Hanna, M. A. & Co. .....Cleveland.
Pickands, Mather & Co. .....Cleveland.
Pittsburg Coal Co. .....Cleveland.
Rochester & Pittsburg Coal & Iron Co. ....Buffalo.
Smith, Stanley B. & Co. .....Detroit.
Youghiogheny & Lehigh Valley Coal Co...Chicago.

GASKETS, RUBBER.
New York Belting & Packing Co.....New York.

GAS BUOYS.
Safety Car Heating & Lighting Co. ..New York.

GAS AND GASOLINE ENGINES.
Chase Machine Co. .....Cleveland.

GAGES, STEAM AND VACUUM.
American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.

GRAPHITE.
Dixon Crucible Co., Joseph .....Jersey City, N. J.

HAMMERS, STEAM.
Bell Engineering Works, David .....Buffalo.
Chase Machine Co. .....Cleveland.
Railway Appliances Co .....Chicago.

HARDWARE, SHIP.
Topky Brothers .....Ashtabula, O.

HATCH GEARS.
"Long-Arm" System Co. .....Cleveland.

HEATING APPARATUS.
Buffalo Forge Co. .....Buffalo.
Sturtevant, B. F. Co. .....Boston.

HOISTS FOR CARGO, ETC.
American Ship Building Co.....Cleveland.
Brown Hoisting Machinery Co., Inc. ....Cleveland.
Chase Machine Co. .....Cleveland.
Elwell-Parker Electric Co. .....Cleveland.
General Electric Co. .....New York.
Hyde Windlass Co. .....Bath, Me.
Lidgerwood Mfg. Co.....New York.
Marine Iron Co. .....Bay City.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

HOLLOW STAYBOLT IRON.
Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

HOSE FITTINGS.
Farnan Brass Works. .....Cleveland.

HOSE, RUBBER.
New York Belting & Packing Co.....New York.

HYDRAULIC MACHINERY.
Watson-Stillman Co., The.....New York.
Wood & Co., R. D. .....Philadelphia.

ICE MACHINERY.
American Linde Refrigerating Co. .....New York.
Roelker, H. B. .....New York.

INDICATORS FOR STEAM ENGINES.
American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.

INJECTORS.
American Injector Co.....Detroit.
Crane Co. .....Chicago.
Jenkins Bros. .....New York.
Lunkenheimer Co. .....Cincinnati.
Penberthy Injector Co. ....Detroit, Mich.

INSURANCE, MARINE.
Brown & Co. .....Buffalo.
Brown, W. W. .....Cleveland.
Dunham, R. J. .....Chicago.
Elphicke, C. W. & Co. .....Chicago.
Hawgood & Co., W. A. .....Cleveland.
Helm & Co., D. T.....Duluth.
Hutchinson & Co. .....Cleveland.
Insurance Co. of North America....Philadelphia
McCarthy, T. R. .....Montreal.
McCurdy, Geo. L. .....Chicago.
Mitchell & Co. .....Cleveland.
Peck, Chas. E. & W. F. ...New York and Chicago.
Richardson, W. C. .....Cleveland.
Sullivan, D. & Co. .....Chicago.
Weeks, F. H. .....New York.

IRON ORE AND PIG IRON.
Bourne-Fuller Co. .....Cleveland.
Hanna, M. A. & Co. .....Cleveland.
Pickands, Mather & Co. .....Cleveland.

LATHE, FOR CUTTING PIPE THREADS.
Kent Machine Works .....Brooklyn, N. Y.

LAUNCHES—STEAM, NAPHTHA, ELECTRIC.
Marine Construction & D. D. Co.....
.....Mariner's Harbor, S. I., N. Y.
Warrington Iron Works .....Chicago.
Willard, Chas. P. .....Chicago.

LIFE PRESERVERS, LIFE BOATS, BUOYS.
Armstrong Cork Co. .....Pittsburg.
Drein, Thos. & Son .....Wilmington, Del.
Kahnweiler's Sons, D. .....New York.
Lane & DeGroot .....Long Island City, N. Y.
Marine Construction & Dry Dock Co.....
.....Mariner's Harbor, S. I., N. Y.

LIGHTS, SIDE AND SIGNAL.
Helvig, H. A. J.....New York.
Russell & Watson .....Buffalo.

LOGS.
Walker & Sons, Thomas .....Birmingham, Eng.
Nicholson Ship Log Co. .....Cleveland.
Also Ship Chandlers.

MACHINISTS.
Chase Machine Co.....Cleveland.
Macbeth Iron Co. .....Cleveland.
Union Machine & Boiler Co.....Cleveland.
Ward Machine Co.....Cleveland.

MACHINE TOOLS (WOOD WORKING).
Atlantic Works, Inc. .....Philadelphia.

MACHINERY, NEW AND SECOND HAND.
Bowler & Co. Geo. H. .....Cleveland.
Clyde Machine Works.....Chicago.

MAN-HOLES, SWING DOORS, ETC.
"Long-Arm" System Co. .....Cleveland.

MARINE RAILWAYS, BUILDERS OF
Crandall & Son, H. I. .....East Boston, Mass.

MATTRESSES, CUSHIONS, BEDDING.
Fogg, M. W.....New York.

MECHANICAL DRAFT FOR BOILERS.
American Ship Building Co. .....Cleveland
Bloomsburg & Co., H. .....Baltimore, Md.
Buffalo Forge Co. .....Buffalo.
Detroit Ship Building Co. .....Detroit
Sturtevant, B. F. Co. .....Boston.

METALLIC PACKING.
Allen, Joseph .....Collingswood, N. J.
American Metallic Packing Co .....Cleveland.
Hayden Mfg. Co., N. L.....Columbus, O.
Katzenstein, L. & Co. .....New York.
U. S. Metallic Packing Co. .....Philadelphia.

METAL POLISH.
Bertram's Oil Polish Co. .....Boston.

MOTORS, GENERATORS—ELECTRIC.
Buffalo Forge Co. .....Buffalo.
Electro-Dynamic Co. .....Philadelphia.
Elwell-Parker Electric Co. .....Cleveland.
General Electric Co. .....Schenectady, N. Y.
"Long-Arm" System Co. .....Cleveland.
Seidler-Miner Electric Co. .....Detroit.
Sturtevant, B. F. Co. .....Boston.
United Marine Mfg. & Supply Co.....New York.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

NAUTICAL INSTRUMENTS.
Bliss, John & Co. .....New York.
Ritchie, E. S. & Sons .....Brookline, Mass.

NAVAL ARCHITECTS.
Gaskin, Edward .....Buffalo.
Goodenough, Walter .....New York.
Kidd, Joseph .....Duluth, Minn.
Logan, Robert .....Cleveland.
Mosher, Chas. D. .....New York.
Newman, R. L. .....New York.
Sadler, Perkins & Field.....New York
See, Horace.....New York.
Wood, W. J. .....Chicago.

OAKUM.
DeGrauw, Aymar & Co. .....New York.
Stratford Oakum Co.,.....Jersey City, N. J.

OILS AND LUBRICANTS.
Dixon Crucible Co., Joseph .....Jersey City, N. J.
Standard Oil Co. .....Cleveland.

OIL FILTERS.
Haines Co., W. S. .....Philadelphia.

PACKING.
Allen, Joseph .....Collingswood, N. J.
American Metallic Packing Co .....Cleveland,
American Steam Packing Co ..... Boston.
Crane Co. .....Chicago.
Hayden Mfg. Co., N. L.....Columbus, O.
Jenkins Bros. .....New York.
Katzenstein, L. & Co. .....New York.
New York Belting & Packing Co.....New York.
United States Metallic Packing Co. ....Philadelphia.

PAINTS.
Baker, Howard H. & Co. .....Buffalo.
Berry Bros., Ltd. .....Detroit.
Day's Varnish & Dryer Co. .....Cleveland.
Mohawk Paint & Chemical Co.....New York.
New Jersey Zinc Co. .....New York.
Topky Brothers .....Ashtabula, O.
Upson-Walton Co. .....Cleveland.

PATENT ATTORNEYS.
Thurston & Bates .....Cleveland,

PATTERN SHOP MACHINERY.
Atlantic Works, Inc. .....Philadelphia.

PIPE—BRASS AND COPPER, IRON PIPE SIZE.
Waterbury Brass Co.....New York.

PIPE, WROUGHT IRON.
Bourne-Fuller Co .....Cleveland.
Crane Co .....Chicago.
Macbeth Iron Co.....Cleveland.

PLANING MILL MACHINERY.
Atlantic Works, Inc. .....Philadelphia.

PLATE BENDING AND PLANING MACHINES.
Wood & Co., R. D. .....Philadelphia.

PLUMBING, MARINE.
Mott, J. L., Iron Works .....New York.
Reilly Repair & Supply Co., James....New York.
Sands, Alfred B. & Son .....New York.

PNEUMATIC TOOLS.
Allen, John F., ... New York.
Chicago Pneumatic Tool Co. .....Chicago.
Railway Appliances Co .....Chicago.

POLISH FOR METALS.
Bertram's Oil Polish Co.....Boston.

POWER DOORS AND HATCHES.
"Long-Arm" System Co. .....Cleveland.

PRESSURE REGULATORS.
Kieley & Mueller .....New York
Ross Valve Co. .....Troy, N. Y.

BUYERS' DIRECTORY OF THE MARINE TRADE.—Continued.

PROPELLER WHEELS.

American Ship Building Co. .....Cleveland
Atlantic Works .....East Boston, Mass.
Baltimore Ship Building & Dry Dock Co. Baltimore.
Bath Iron Works, Ltd. .....Bath, Me.
Cramp, Wm. & Sons.....Philadelphia.
Detroit Ship Building Co. .....Detroit.
Fore River Ship & Engine Co. .....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Hyde Windlass Co. .....Bath, Me.
Harlan & Hollingsworth Co.....Wilmington, Del.
Jenks Ship Building Co. .....Port Huron, Mich.
Lockwood Mfg. Co. .....East Boston, Mass.
Macbeth Iron Co.....Cleveland.
MacKinnon Mfg. Co. .....Bay City, Mich.
Maryland Steel Co. .....Sparrow's Point, Md.
Milwaukee Dry Dock Co. .....Milwaukee.
Moran Bros. Co. .....Seattle, Wash.
Neafie & Levy Ship & Engine Bldg. Co.....Phila.
Newport News Ship Bldg. Co...Newport News, Va.
Nixon, Lewis .....Elizabeth, N. J.
Phosphor Bronze Smelting Co., Ltd...Philadelphia.
Pusey & Jones Co. .....Wilmington, Del.
Risdon Iron Works .....San Francisco.
Roelker, H. B. .....New York.
Sheriffs Mfg. Co. .....Milwaukee.
Superior Ship Building Co.....Superior, Wis.
Thropp & Sons Co., J. E. .....Trenton, N. J.
Trigg, Wm. R. Co. .....Richmond, Va.
Trout, H. G. .....Buffalo.

PROJECTORS, ELECTRIC.

Elwell-Parker Electric Co. .....Cleveland.
General Electric Co. .....Schenectady, N. Y.
Seidler-Miner Electric Co. .....Detroit.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa

PUMPS FOR VARIOUS PURPOSES.

Blake, Geo. F. Mfg. Co. .....New York.
Clyde Machine Works.....Chicago.
Great Lakes Engineering Works.....Detroit.
Kingsford Foundry & Machine Wks. Oswego, N. Y.

PUNCHES, RIVETERS, SHEARS.

Chicago Pneumatic Tool Co. .....Chicago.

REFRIGERATING APPARATUS.

Roelker, H. B. .....New York.

REGISTER FOR CLASSIFICATION OF VESSELS.

Great Lakes Register .....Cleveland.
Record of American & Foreign Shipping.New York.

RELEASING HOOKS FOR DETACHING BOATS.

Standard Automatic Releasing Hook Co. New York.

RIVETS, STEEL, FOR SHIPS AND BOILERS.

Bourne-Fuller Co. .....Cleveland.

RANGES.

Russell & Watson .....Buffalo.

RIVETS—BRASS AND COPPER.

Waterbury Brass Co.....New York.

RUBBER INSULATED WIRES.

Roebling's Sons, Jno. A...New York and Cleveland.

SAFETY VALVES.

American Steam Gauge Co. .....Boston.
Ashton Valve Co.....Boston.
Hayden Mfg. Co., N. L.....Columbus, O.
Lunkenheimer Co. .....Cincinnati.

SAIL MAKERS.

Baker, Howard H. & Co. .....Buffalo.
Upson-Walton Co. .....Cleveland.
Wilson & Silsby .....Boston.

SALVAGE COMPANIES.

See Wrecking Companies.

SCHOOLS—NAUTICAL, ENGINEERING.

Chicago Nautical School .....Chicago.

SEARCH LIGHTS.

Elwell-Parker Electric Co. .....Cleveland.
General Electric Co. .....Schenectady, N. Y.
Seidler-Miner Electric Co. .....Detroit.
Westinghouse Electric & Mfg. Co....Pittsburg, Pa.

SHEARS.

See Punches, Rivets, and Shears.

SHIP AND BOILER PLATES AND SHAPES.

Bourne-Fuller Co. .....Cleveland.

SHIP BUILDERS.

American Ship Building Co. .....Cleveland.
Atlantic Works .....East Boston, Mass.
Baltimore Ship Building & Dry Dock Co..Baltimore.
Bath Iron Works, Ltd.....Bath, Me.
Bell Engineering Works, David .....Buffalo.
Buffalo Dry Dock Co. .....Buffalo.
Cramp, Wm. & Sons.....Philadelphia.
Craig Ship Building Co. .....Toledo, O.
Chicago Ship Building Co.....Chicago.
Detroit Ship Building Co. .....Detroit.
Fore River Ship & Engine Co. .....Quincy, Mass.
Great Lakes Engineering Works.....Detroit.
Harlan & Hollingsworth Co. .....Wilmington, Del.
Jenks Ship Building Co. .....Port Huron, Mich.
Lockwood Mfg. Co.....East Boston, Mass.
Manitowoc Dry Dock Co.....Manitowoc, Wis.
Marine Construction & Dry Dock Co.....
.....Mariner's Harbor, S. I., N. Y.
Maryland Steel Co .....Sparrow's Point, Md.
Milwaukee Dry Dock Co.....Milwaukee.
Moran Bros. Co. .....Seattle, Wash.
Neafie & Levy Ship & Engine Bldg. Co.....Phila.
Newport News Ship Bldg. Co....Newport News, Va.
Nixon, Lewis .....Elizabeth, N. J.
Pusey & Jones Co. .....Wilmington, Del.
Risdon Iron Works .....San Francisco.
Roach's Ship Yard .....Chester, Pa.
Smith & Son, Abram .....Algonac, Mich.
Trigg, Wm. R. Co. .....Richmond, Va.
Warrington Iron Works .....Chicago.
Willard, Chas. P. & Co. .....Chicago.

SHIP CHANDLERS.

Baker, Howard H. & Co. .....Buffalo.
Moran Bros. Co. .....Seattle, Wash.
Reilly Repair & Supply Co., James....New York.
Upson-Walton Co. .....Cleveland.

SHIP LANTERNS AND LAMPS.

Helvig, H. A. J.....New York.
Page Bros. & Co.....New York.
Russell & Watson.....Buffalo.

SMOOTH-ON COMPOUND, FOR REPAIRS.

Smooth-On Mfg. Co. .....Jersey City, N. J.

SPARS—LARGE SIZES.

Moran Bros. Co.....Seattle, Wash.

STAYBOLTS, IRON OR STEEL, HOLLOW, OR SOLID.

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

STEAM VESSELS FOR SALE.

Elwell, Jas. W. & Co.....New York.
Holmes, Samuel.....New York.
King, Rufus S.....New York.
McCarthy, T. R.....Montreal, Can.
Newman, R. L.....New York.
Weeks, F. H.....New York.

STEAMSHIP LINES, PASS. AND FREIGHT.

American Line.....New York.
Erie & Western Trans. Co.....Buffalo.
International Nav. Co.....Philadelphia.
Pere Marquette R. R. & S. S. Line....Milwaukee.
Red Star Line.....New York.

STEEL CASTINGS.

Seaboard Steel Casting Co.....Chester, Pa.
Macbeth Iron Co.....Cleveland.

STEERING APPARATUS.

American Ship Building Co.....Cleveland.
Chase Machine Co. .....Cleveland.
Dake Engine Co.....Grand Haven, Mich.
Detroit Shipbuilding Co.....Detroit.
Electro-Dynamic Co.....Philadelphia.
Hyde Windlass Co.....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.
Queen City Engineering Co.....Buffalo.
Sheriff Mnfg. Co.....Milwaukee.

STOCKS, BONDS, SECURITIES.

Brown, W. W.....Cleveland.
Fahey & Co.....Cleveland.

SUBMARINE DIVING APPARATUS

Morse & Son, A. J.....Boston.
Schrader's Son, A.....New York.

SURVEYORS, MARINE.

Goodenough, Walter.....New York.
Gaskin, Edward.....Buffalo.
Newman, R. L.....New York.
See, Horace.....New York.
Wood, W. J.....Chicago.

TESTS OF MATERIAL.

Hunt, Robert W. & Co.....Chicago.
Pittsburg Testing Laboratory, Ltd.....Pittsburg.

TILING, INTERLOCKING RUBBER.

New York Belting & Packing Co.....New York.

TOOLS, METAL WORKING, FOR SHIP AND ENGINE WORKS.

Allen, John F.....New York.
Chicago Pneumatic Tool Co.....Chicago.
Railway Appliances Co .....Chicago.
Watson-Stillman Co.....New York.

TOOLS, WOOD WORKING.

Atlantic Works, Inc.....Philadelphia.

TOWING MACHINES.

American Ship Windlass Co.....Providence, R. I.
Chase Machine Co.....Cleveland.

TOWING COMPANIES.

Donnelly Salvage & Wrecking Co....Kingston, Ont.
Midland Towing & Wrecking Co., Ltd.Midland, Ont.

TRAPS, STEAM.

Haines Co., Wm. S.....Philadelphia.
Kieley & Mueller.....New York.

TRUCKS.

Boston & Lockport Block Co..... .....Boston.

TUBING, SEAMLESS.

Benedict & Burnham Mnfg. Co....Waterbury, Conn.
National Tube Co.....Pittsburg.
Waterbury Brass Co.....New York.

VALVES, STEAM SPECIALTIES, ETC.

American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.
Crane Co. .....Chicago.
Farnan Brass Works .....Cleveland.
Hayden Mfg. Co., N. L.....Columbus, O.
Jenkins Bros.....New York.
Kieley & Mueller.....New York.
Lunkenheimer Co.....Cincinnati.
Ross Valve Co. .....Troy, N. Y.

VALVES FOR WATER AND GAS.

Wood & Co., R. D.....Philadelphia.
Ross Valve Co. .....Troy, N. Y.

VARNISHES.

Berry Brothers, Ltd.....Detroit.
New Jersey Zinc Co.....New York.
Also Ship Chandlers.

VESSEL CASTINGS.

American Ship Building Co.....Cleveland.
Macbeth Iron Co.....Cleveland.

VESSEL AND FREIGHT AGENTS.

Boland, John J.....Buffalo.
Brown & Co.....Buffalo.
Brown, W. W.....Cleveland.
Dunham, R J. .....Chicago.
Elwell, Jas. W. & Co.....New York.
Elphicke, C. W & Co.....Chicago.
Hall & Root.....Buffalo.
Helm & Co., D. T. ..... Duluth
Hawgood & Co., W. A.....Cleveland.
Holmes, Samuel.....New York.
Hutchinson & Co.....Cleveland.
King, Rufus S.....New York.
McCarthy, T. R.....Montreal.
Newman, R. L.....New York.
Mitchell & Co.....Cleveland.
Richardson, W. C.....Cleveland.
Sullivan, D. & Co.....Chicago.
Weeks, F. H.....New York.

VENTILATING APPARATUS FOR SHIPS.

Buffalo Forge Co. .....Buffalo.
Sturtevant, B. F. Co.....Boston.

WIRE—BRASS AND COPPER.

Waterbury Brass Co.....New York.

WIRE ROPE AND WIRE ROPE FITTINGS.

Baker, H. H. & Co.....Buffalo.
DeGrauw, Aymar & Co. .....New York
Roebling's Sons John A....New York and Cleveland.
Upson-Walton Co.....Cleveland.

WHISTLES, STEAM.

American Steam Gauge Co. .....Boston.
Ashton Valve Co. .....Boston.
Farnan Brass Works .....Cleveland.
Lunkenheimer Co.....Cincinnati.

WHITE METAL—SHEETS, RODS AND WIRE.

Waterbury Brass Co.....New York.

WINDLASSES.

American Ship Windlass Co.....Providence, R. I.
American Ship Building Co. .....Cleveland
Hyde Windlass Co.....Bath, Me.
Jenks Ship Building Co.....Port Huron, Mich.

WINCHES.

American Ship Windlass Co.....Providence, R. I.
Hyde Windlass Co.....Bath, Me.

WOOD WORKING MACHINERY.

Atlantic Works, Inc.....Philadelphia.

WRECKING AND SALVAGE COMPANIES.

Donnelly Salvage & Wrecking Co....Kingston, Ont.
Midland Towing & Wrecking Co., Ltd.Midland, Ont.

YACHT AND BOAT BUILDERS.

Bell Engineering Works, David .....Buffalo.
Drein, Thos. & Son.....Wilmington, Del.
Lane & DeGroot.....Long Island City, N. Y.
Marine Construction & Dry Dock Co. ...New York.
Truscott Boat Mfg. Co. .....St. Joseph, Mich.
Warrington Iron Works.....Chicago.
Willard, Chas. P. & Co.....Chicago.

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Drein, Thos. & Son.....Wilmington, Del.
Lane & DeGroot.....Long Island City, N. Y.

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Schuylkill. Conestoga. Clarion.
Delaware. Juniata. Lehigh.
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Detroit. Sault Ste. Marie. Marquette.
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E. T. EVANS, Western Manager, Buffalo, N. Y.

LAKE SHORE & MICHIGAN SOUTHERN RY.

Eastward.	Arrive from West	Depart East.
No. 18, Southwestern Lim	.....	1:50am
No. 22, Lake Shore Lim...	*2:15am	*2:20am
No. 20, Chi & Cleve Ex....	*7:20am	.....
No. 28, N Y & Bost Ex....	*7:40am	*8:00am
No. 40, Toledo & Buff Ac.	†10:00am	†10:40am
No. 32, Fast Mail	*11:25am	*11:30am
No. 44, Ac via Sandusky..	†1:40pm	.. ....
No. 46, Southwestern Ex.	....	*3:00pm
No. 106, Conneaut Accom	.....	†4:30pm
No. 6, Lim Fast Mail....	*5:40pm	*5:45pm
No. 26, 20th Cent L.m....	*7:40pm	*7:43pm
No. 10, C., N Y & B Sp....	*7:30pm	*7:50pm
No. 16, New Eng Ex.....	*10:30pm	*10:35pm
No. 2, Day Express.....	†9:10pm	†9 25pm
No. 126, Norwalk Accom.	†7:50am	.....

Westward.	Arrive from East.	Depart West.
No. 11, Southwestern Lim	*3:25am	.....
No. 7, Day Express.....	.....	†6:10am
No. 15, Bost & Chi Sp.....	*3:10am	*3:15am
No. 19, Lake Shore Lim..	*7:15am	*7:20am
No. 23, Western Express.	*10:30am	*10:35am
No. 33, Southern Express	*12:25pm	....
No. 133, Cleve & Det Ex..	.....	*12:45pm
No. 47, Accomodation.....	†11.20am	†3:00pm
No. 141, Sandusky Accom.	.....	†3:10pm
No. 43, Fast Mail	*4:35pm	*4:40pm
No. 127, Norwalk Accom..	.....	†5:10pm
No. 37 Pacific Express...	*7:00pm	*7:20pm
No 3, Fast Mail Lim.....	*10:50pm	*10:55pm
No. 115, Conneaut Accom.	*8:30am	.....

*Daily. †Except Sunday.
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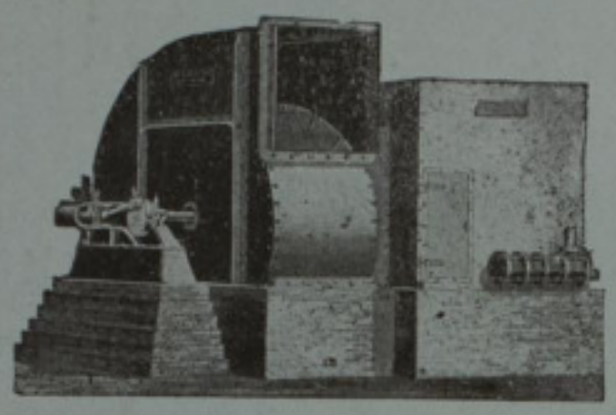

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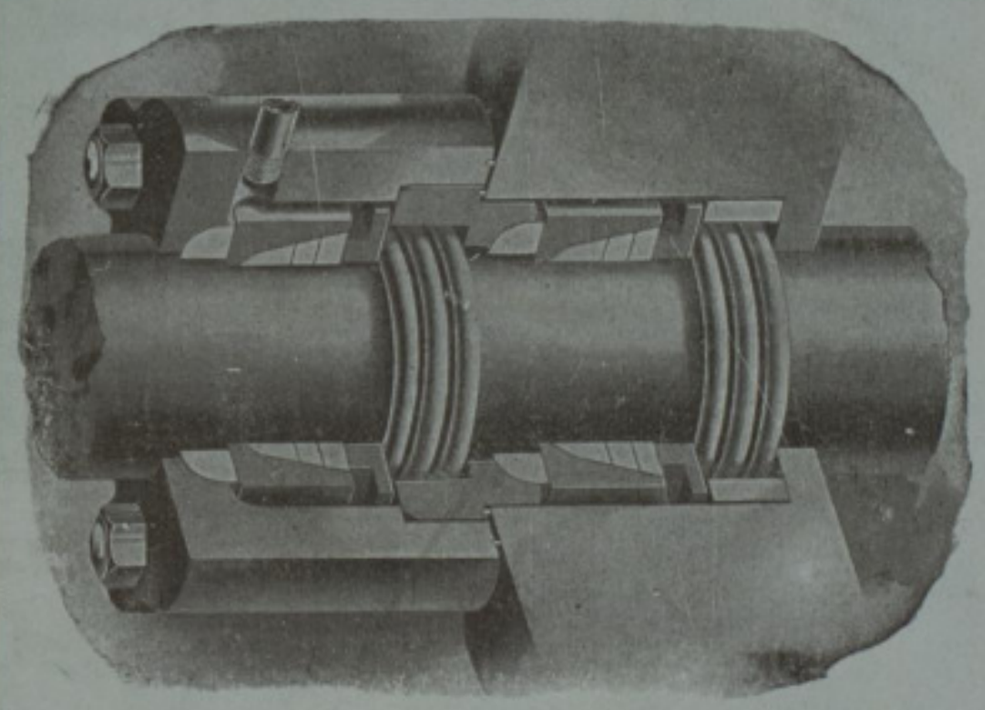

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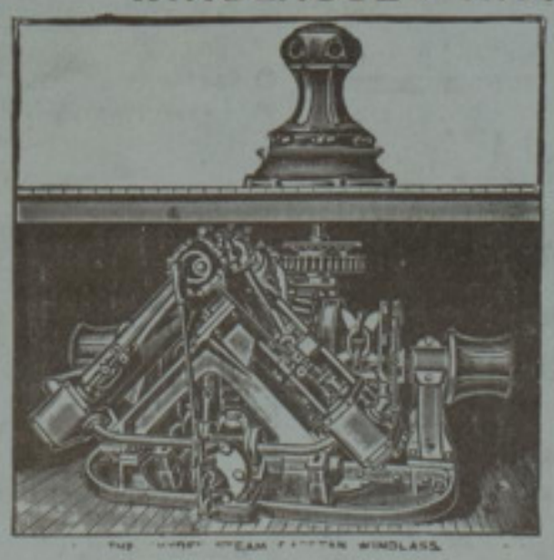

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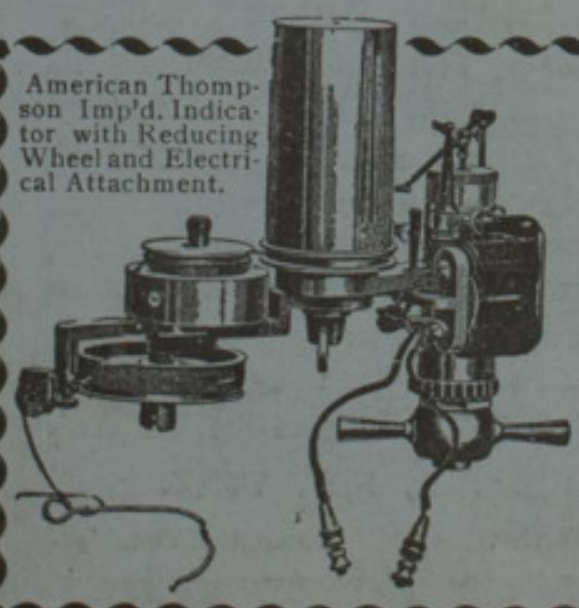

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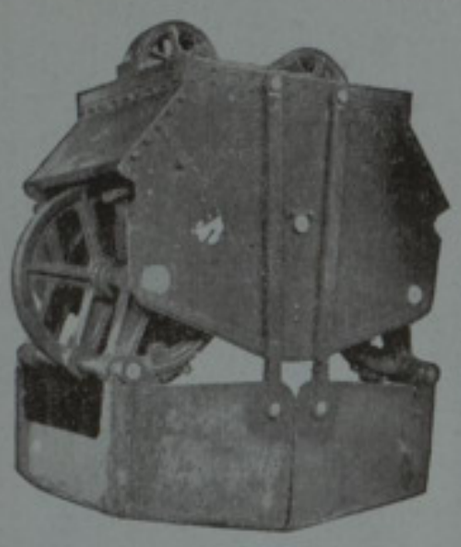

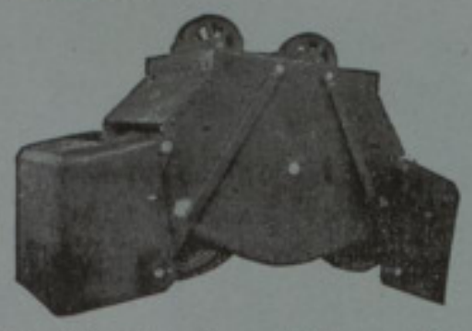

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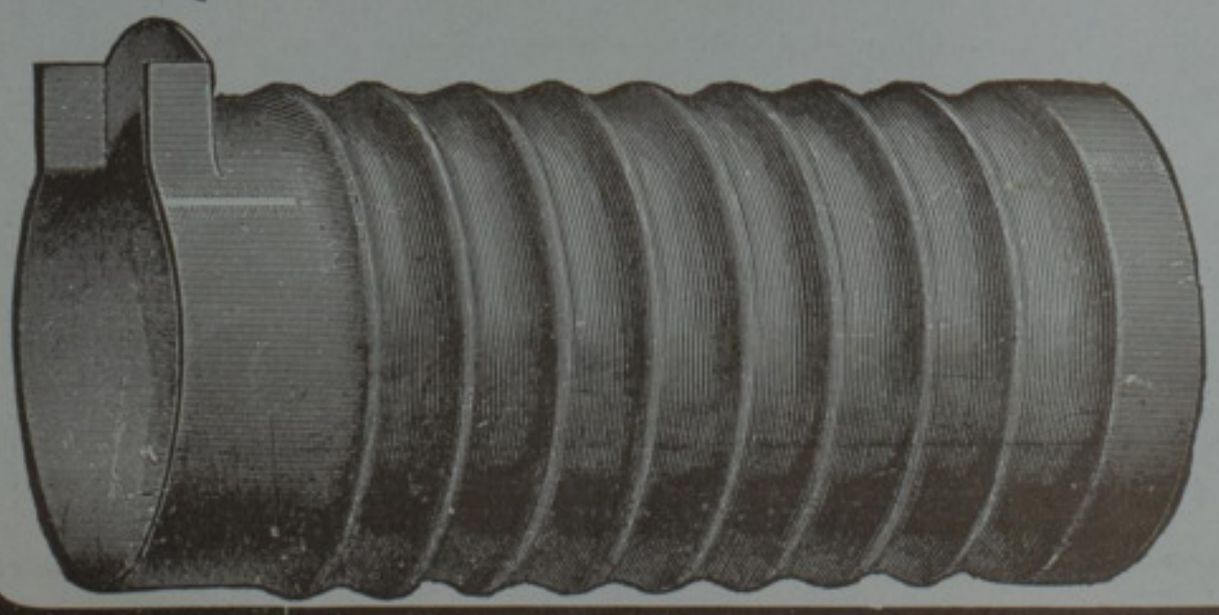

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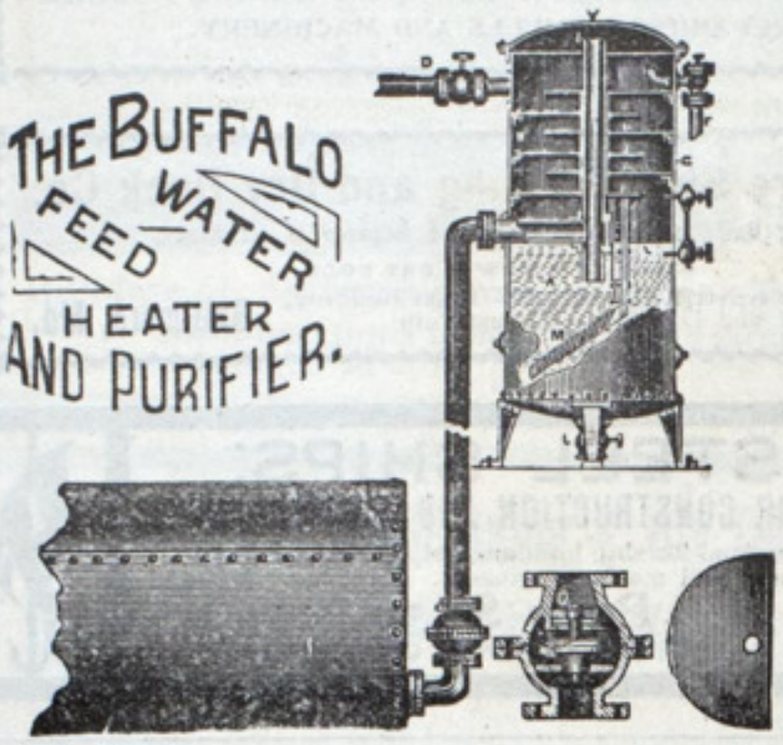

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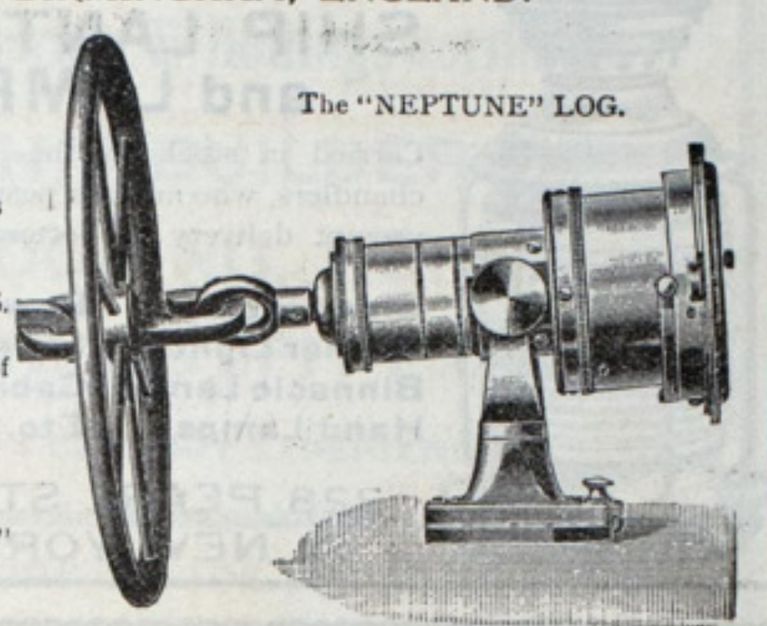

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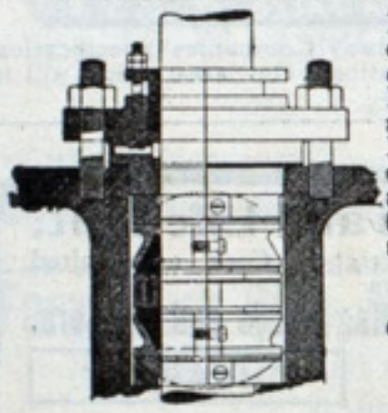

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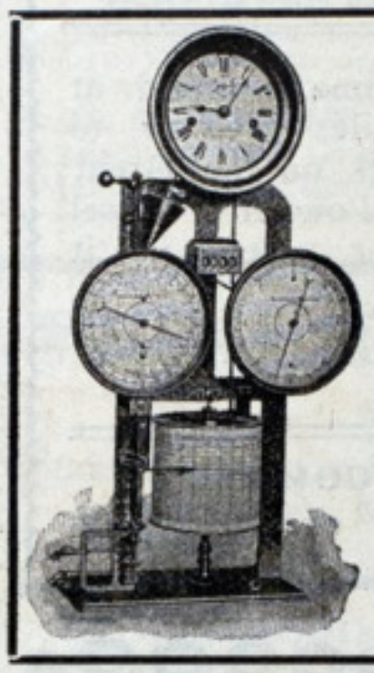

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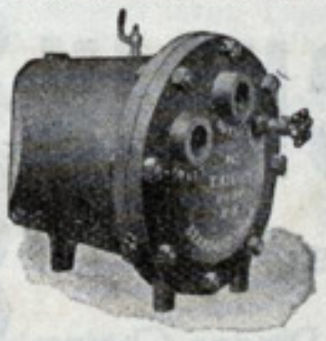

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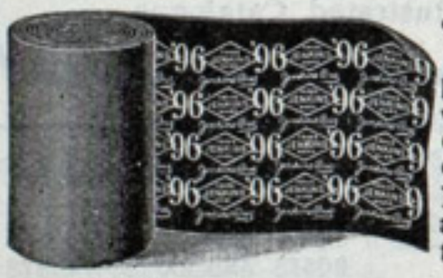

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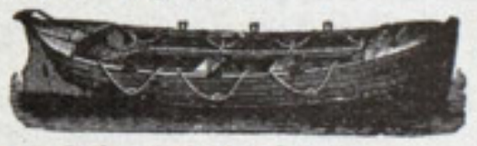

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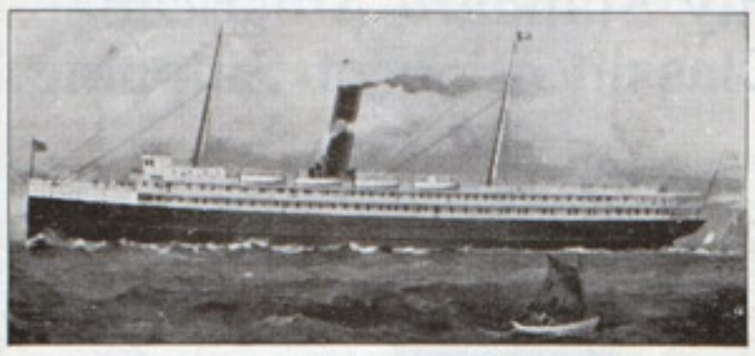

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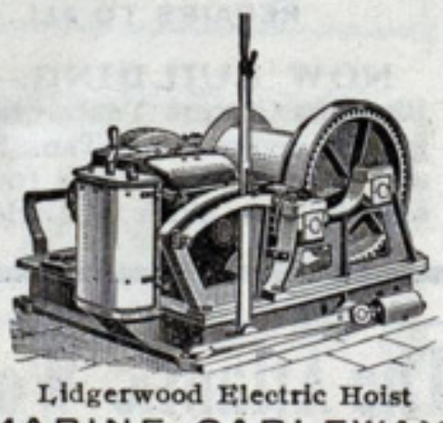
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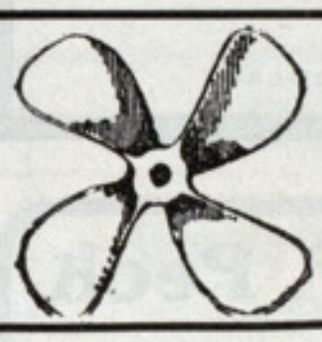

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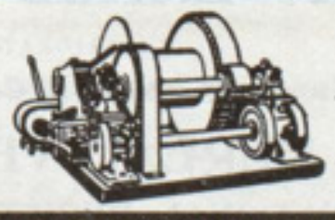

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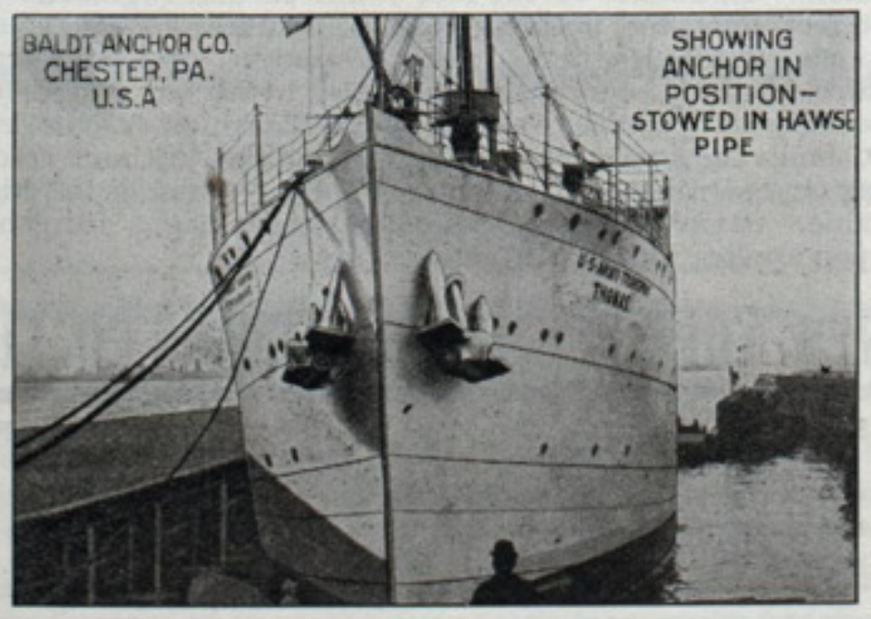

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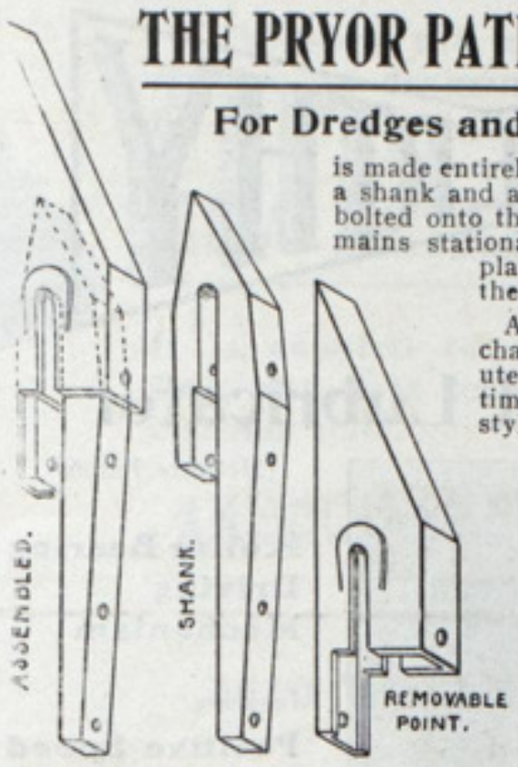

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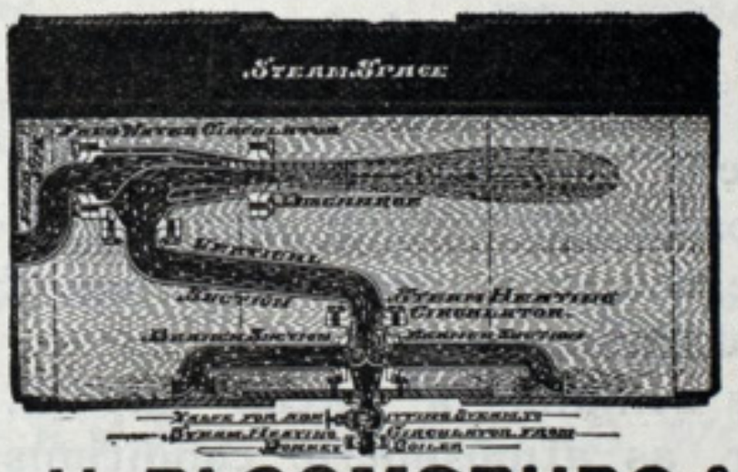

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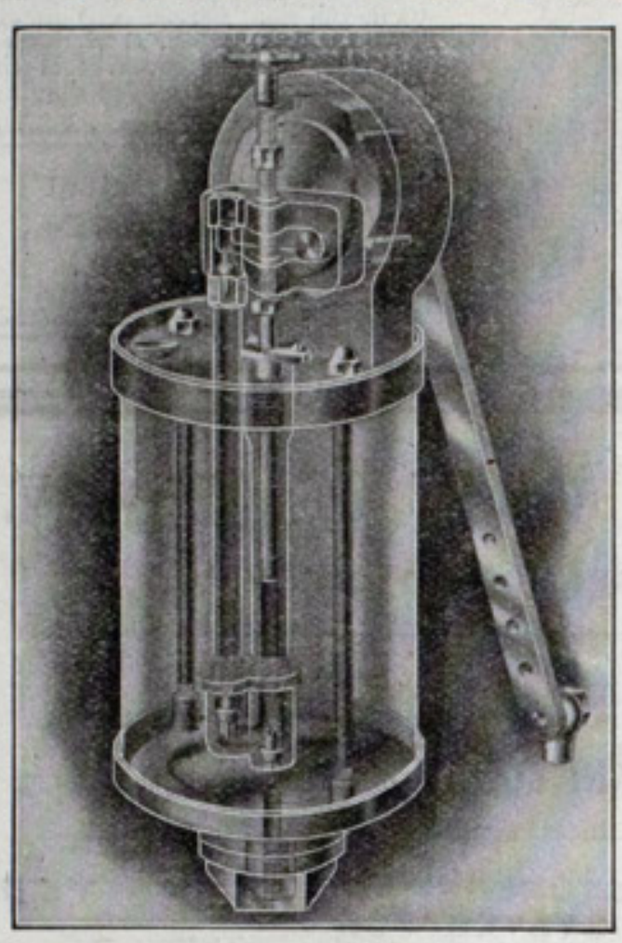

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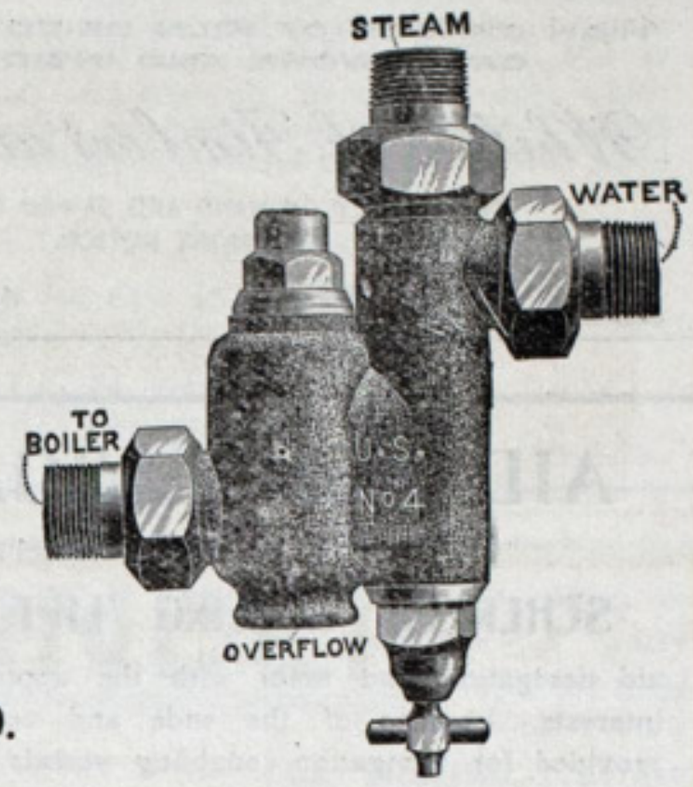

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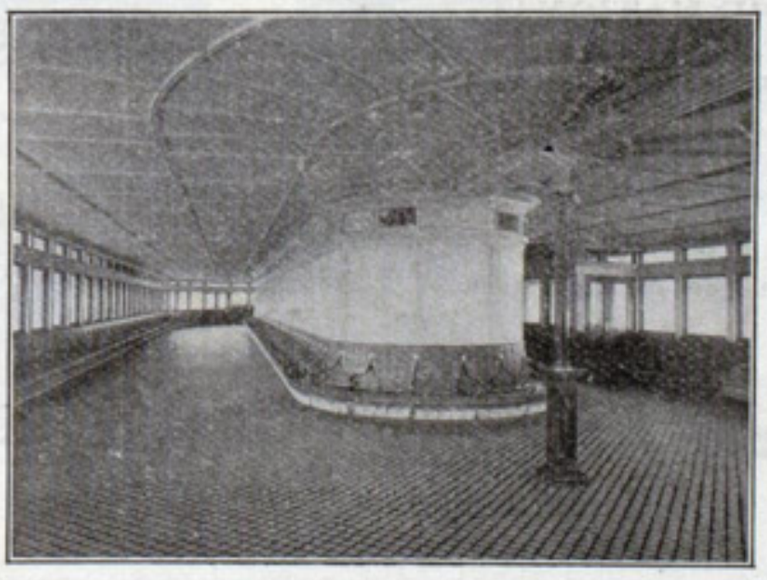

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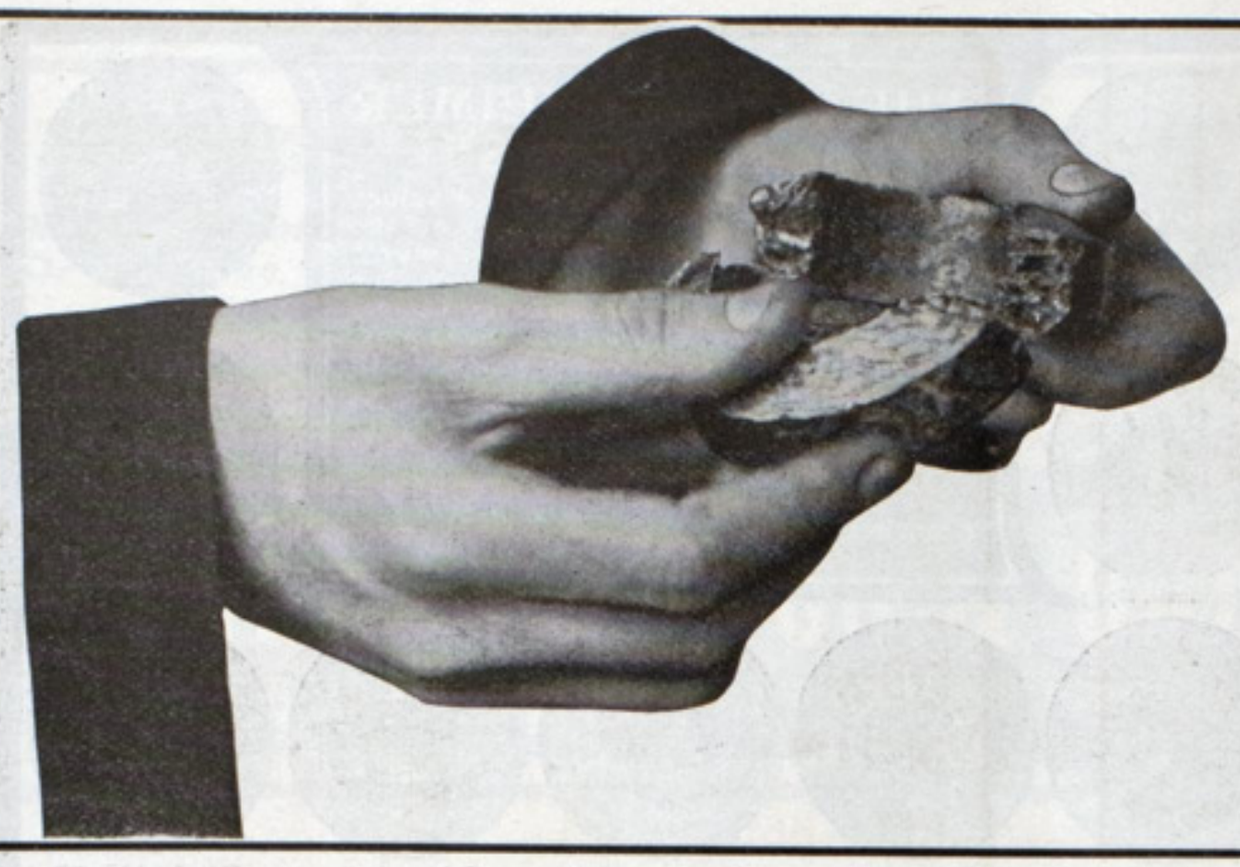

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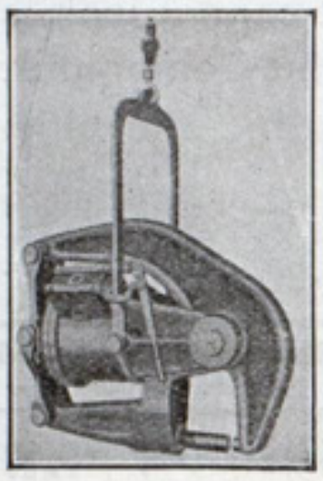

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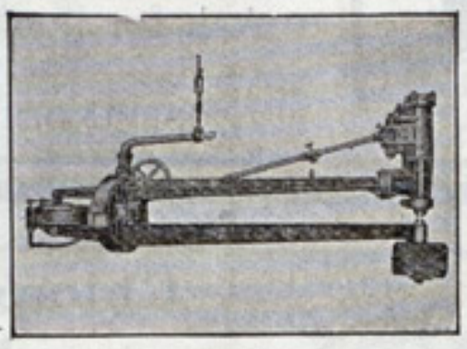

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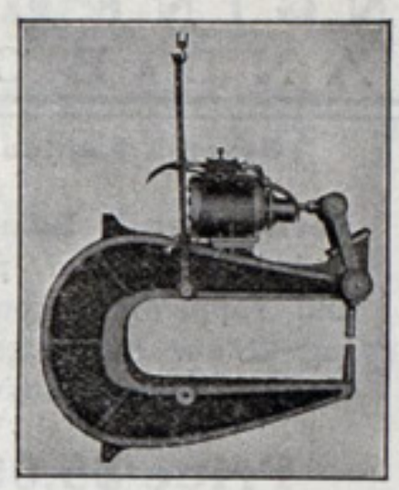

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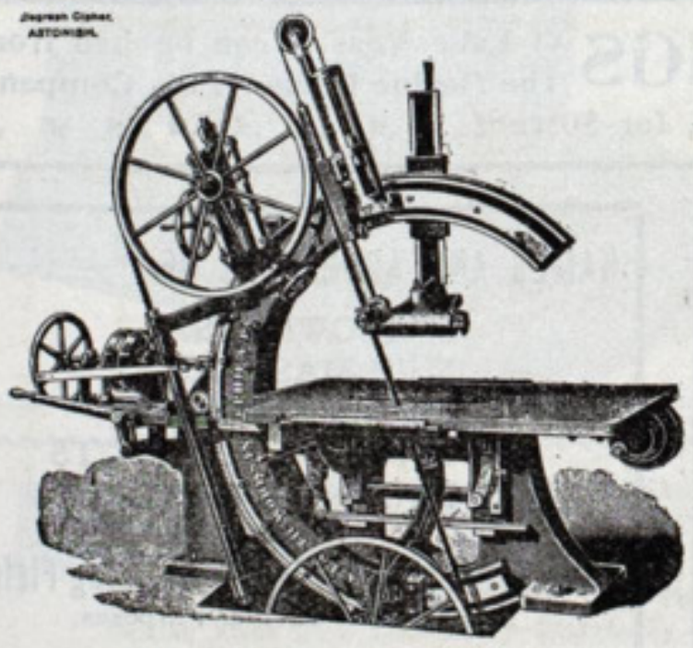

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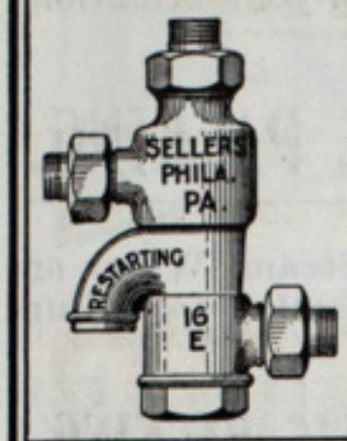

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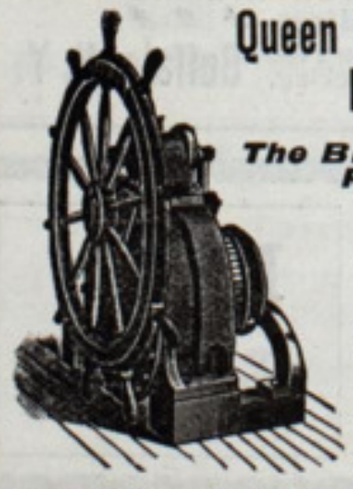

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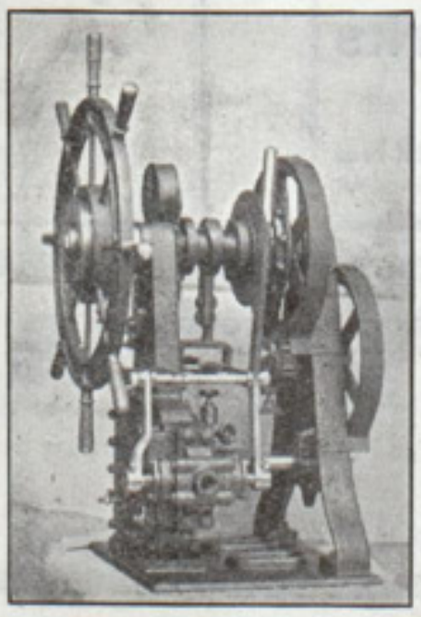

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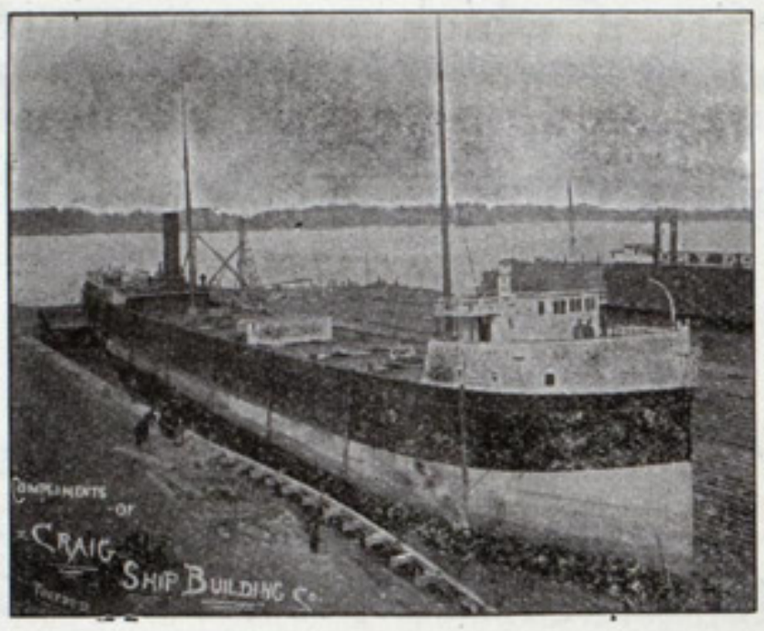

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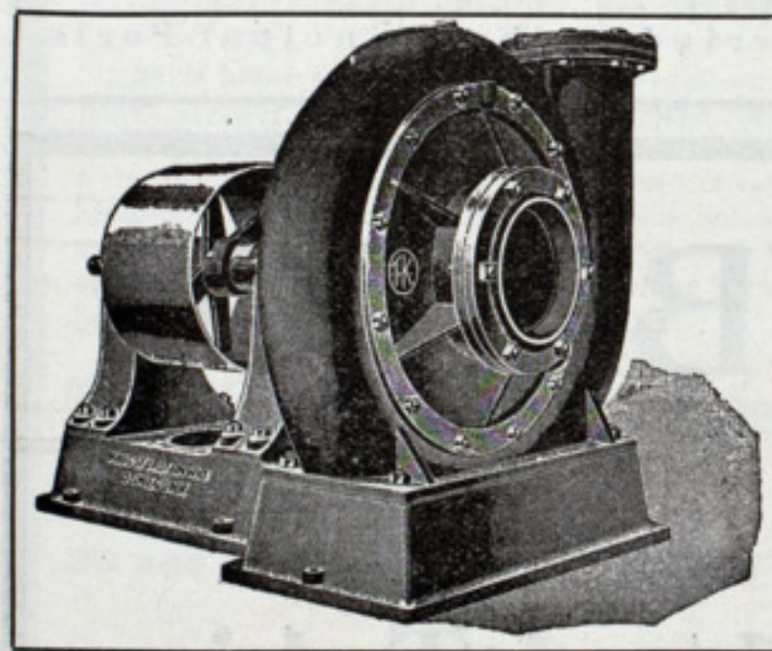

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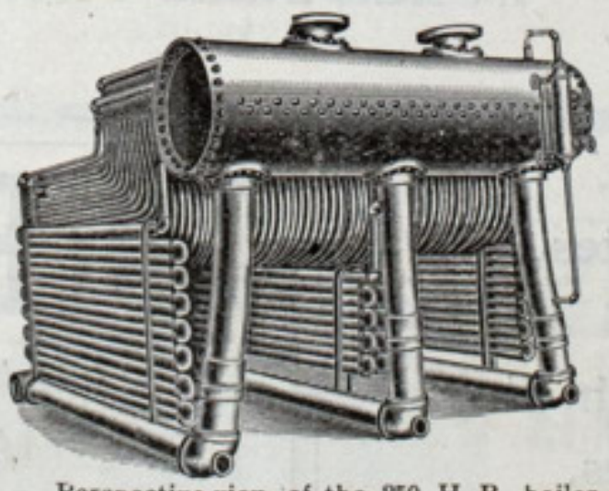

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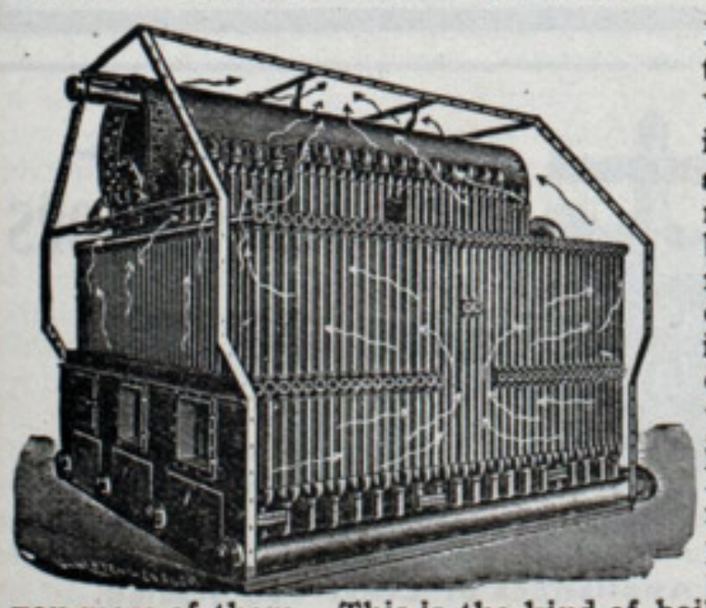

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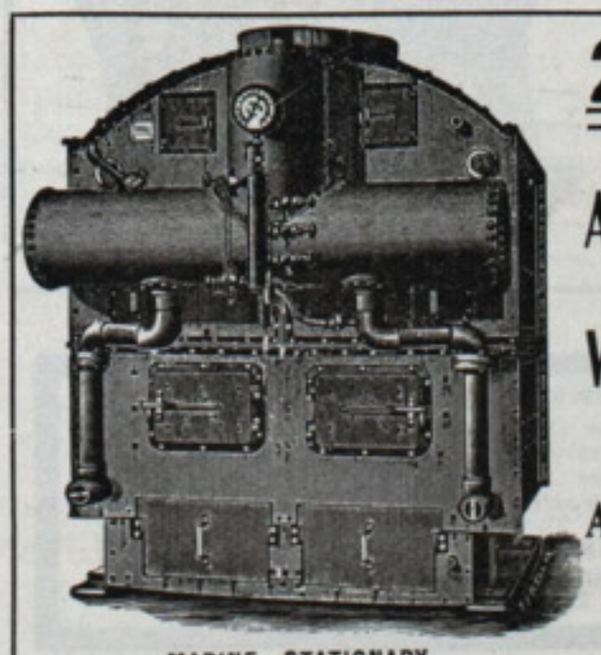

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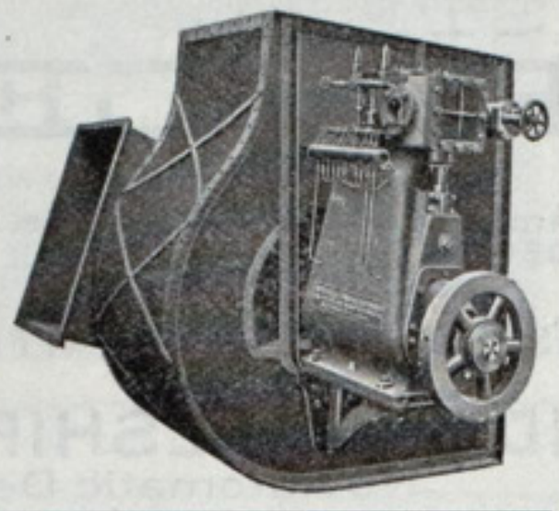

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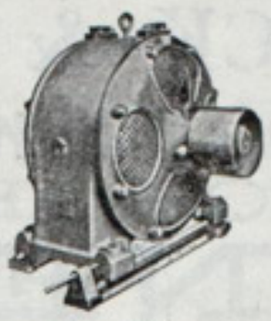

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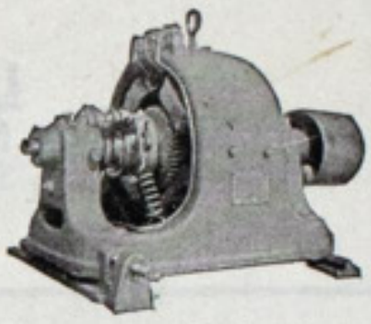

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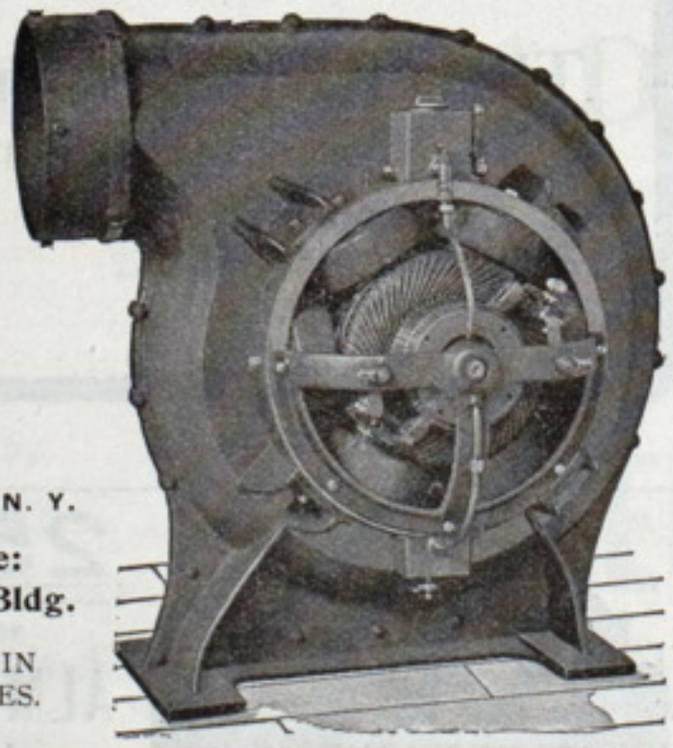

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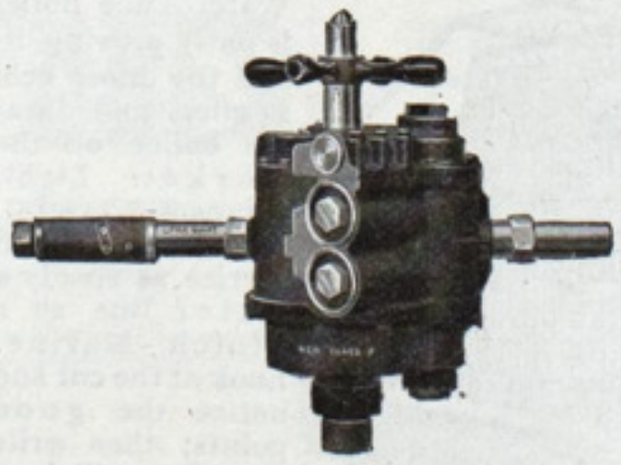

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